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# Report of the Chief of the Forest Service, 1961

United States Department of Agriculture

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U.S. DEPARTMENT OF AGRICULTURE,
FOREST SERVICE,
*Washington, D.C., May 10, 1962.*

HON. ORVILLE L. FREEMAN,
*Secretary of Agriculture.*

DEAR MR. SECRETARY:

This annual report recounts the progress made by the Forest Service in 1961. All the activities and accomplishments occurred under the direction of former chief Richard E. McArdle.

Dr. McArdle retired March 17, 1962, after 39 years with the Forest Service, the last 10 of which he served as chief. During that time the Forest Service made solid progress in developing and protecting the resources of the National Forests, in forestry research, and in cooperative programs with the States to improve privately owned forest land.

The principle of multiple use in land management has gained wide recognition, particularly during the past year. Other public agencies and many private landowners are now managing their lands under this principle. It is heartening to have endorsed in this way a policy we have long promoted. More important, however, is the effect upon the Nation. Private lands will be managed for more effective use of resources; users will reap the benefits of more raw materials and recreational opportunities; owners will gain financially.

Your strong support of our objectives and the keen interest of the President in forest conservation have contributed tremendously to this new interest in our programs.

Sincerely yours,

Edward P. Cliff

EDWARD P. CLIFF,
*Chief, Forest Service.*

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This report covers calendar year activities unless otherwise identified. Where records are on a fiscal year basis, they are so reported.

Issued July 1962

# Report of the Chief of the Forest Service, 1961

## Introduction

"From the beginning of civilization," said President Kennedy in his special message to Congress on natural resources, "every nation's basic wealth and progress has stemmed in large measure from its natural resources."

"Our forest lands present the sharpest challenge to our foresight," the President said further.

This year the challenge was being taken up. It was a year of intense activity and encouraging progress on most Forest Service fronts—in forestry research, National Forest management, and cooperative work with States. The aim: to build and develop for a fast-growing Nation now and in the future the basic natural resources—outdoor recreation, range, timber, water, and wildlife and fish.

One area in which progress might have been greater is in the small privately owned woodlands. As pointed out by the President: "A more difficult and unresolved forest situation lies in that half of our forest land held in small private ownerships. These lands must be managed to produce a larger share of our timber needs. Current forest owner assistance programs have proven inadequate."

Secretary of Agriculture Orville L. Freeman set the tone for aggressive progress in forestry and other natural resources. "We are fortunate in the United States," he said, "to have so ample a supply of land, water, and forest resources—vital national assets. How we conserve, develop, and manage these natural resources has an important effect on our economic growth, on the strength of our Nation, and on the long-run status of our Nation in world affairs."

In many areas forestry was on the move. Some of the highlights for 1961 were these:

**Expanded forestry research** was a part of the year's progress. Additional attention was given to studies of forestry problems on both public and private lands, including special attention to farms and other small private woodlands.

Results of Forest Service research flow constantly to the public through numerous publications, news releases, scientific papers, public patents, and direct industry contact with researchers. Thus the benefits go to the public forests, the private tree-grower, and a large wood-based industry.

**Recreation visits: 102 million.**—Visits to National Forests exceeded for the first time the 100 million mark, representing a 10-percent rise over the number in 1960 and nearly four times the annual visits 10 years ago.

As a growing population centers in traffic-burdened cities, millions more people each year seek nature's tranquil byways. And there's no better place to change the pace, to lull the spirit and renew the soul. Apparently multitudes are learning, as the poet Bliss Carmen wrote, "There is virtue in the open/ There is healing out of doors; The great Physician makes his rounds/ Along the forest floors."

**An accelerated resource effort.**—A "Development Program for the National Forests" was sent to Congress by President Kennedy in September. This is an expanded plan that brings up to date the earlier program submitted to Congress in 1959. It is a broad-scale effort covering resource management and buildup needed on National Forests and National Grasslands to assure that these public lands will meet their full share of present and future needs.

**To let the people know** and understand more about the natural resource values involved in forestry, a "Visitor Information Service" was started. Trained interpreters were placed on duty at heavily used recreation sites, and this service is being expanded so that eventually interpreters will be on duty in summer months (and yearlong in some cases) at all National Forests with large numbers of visitors. The new service will include visitor centers, self-guided tours, lectures, and demonstration areas—all with the purpose of carrying the multiple use management story to people while they are in the forest and thus in the best place to learn.

Along with more education for the visitor who goes to the forest, efforts were stepped up to increase the flow of forestry information to the mass communication media and travel-oriented organizations, including a series of booklets on each of the major forest resources pointing out the benefits to the American people.

**A milestone for eastern National Forests** was marked in celebrations for the 50th anniversary of the Weeks law. Ceremonies were held in Asheville,

N.C., and at Crawford Notch, N.H., near the home of John W. Weeks who led the forces in Congress for the enactment of this law in 1911. This significant legislation enabled the Federal Government to purchase land, primarily in the East where there were no more public domain lands, to be made into National Forests. Now there are some 20 million acres of these "Weeks law" National Forests, providing the people of the East and South, as well as the Nation, with benefits beyond tabulation. The law also opened the way for cooperation with States in fire control and forestry assistance in general.

**Trees planted on nearly 1.8 million acres.** For the country as a whole, tree planting dropped off to 1,796,000 acres or 1,537,000,000 seedlings and 181,400 acres of direct seeding. The record high years for planting were 1959 and 1960, when 2 billion seedlings were planted each year. Significantly, planting increased on Federal lands and most large ownerships; the reduction—35 percent from last year—was in small privately owned forest lands.

**The millionth acre** of National Forest rangeland was revegetated in 1961. The 143,631 acres replanted during the year brought the total to 1,012,156 acres.

**A better home for wildlife** and therefore better hunting and fishing for the American people will be the result of a new "wildlife development program," announced by the Department on March 5, 1961. This plan to improve wildlife habitat is designed to meet the growing public need for hunting and fishing on these lands. Nearly 25 million visits were made to National Forests for hunting and fishing during the year—an increase of about 3 million over 1960 and three times the use in 1950.

**Timber harvest down.**—A total of 8.4 billion board feet of timber was harvested from National Forests in fiscal 1961, a decrease of about 1 billion board feet from last year's figure—due largely to a pronounced dip in the demand for lumber and other forest products.

**Cash receipts: $104 million.**—Total receipts from the National Forest System amounted to $104,422,000—a decrease of about $42 million from the previous year. The sale of timber brought in $98.4 million of the total.

# Forestry Research

For the past 3 years about 2 billion young trees have been planted annually throughout the United States. This amounts to about 11 little trees for every man, woman, and child in the country—an enormous increase over a few years ago. Before planting could be increased substantially, an adequate supply of healthy seedlings had to be produced in nurseries—and that's where research played a decisive role. Only a few years ago starting a nursery seedling crop was a touch-and-go business, for diseases sometimes killed 60 to 80 percent of the young trees before they were out of the nursery.

No such record planting would have been possible if research had not found ways to control these diseases and otherwise improve nursery output.

Today the forest manager can thank the research man for vigorous, low-cost planting stock in almost unlimited supply. And that is only one of numerous ways in which forestry research undergirds forestry progress.

## FOREST RECREATION RESEARCH

Mounting pressure on the recreation resources of the National Forests—the pressure of a visitor load that has more than tripled in the past decade—has required more searching inquiries into and analyses of the fast-growing outdoor recreation.

Forest recreation research is looking for answers to problems forest managers face in their efforts to fit recreation into the total forest use pattern. The growing demands for forest recreation often put pressure on lands that are already being used for other purposes—for water, livestock grazing, wildlife, and timber. The Forest Service has active programs of research into these other uses. Research in recreation is being expanded to assure that forests will provide all of the benefits needed by the people.

Significant programs are underway in all forest regions except Alaska and the Deep South. Basic problems being investigated are: 1) Forest recreational use, 2) forest recreation resources, 3) forest recreation facilities, and 4) economics of forest recreation. Specific problems being studied at the recreation research center in Warren, Pa., as well as countrywide include: Campsite spacing; methods for retarding soil erosion and plant deterioration in heavily used areas and for rehabilitating worn localities; design of facilities; and how to make reliable estimates of use in wilderness as well as in improved areas.

A mapping technique has been devised for measuring recreation use and for determining the pattern of use in developed areas. This technique will be very helpful in planning the development of new areas. And in California, studies show that aerial photos can be helpful in estimating the intensity of recreation use, if specifications for aerial photography are adjusted to meet special research requirements.

## FOREST MANAGEMENT RESEARCH

### How Springwood and Summerwood Form

A major advance has been made in understanding the cause of the growth of springwood and summerwood in trees. By a series of experiments with day length and the application of a growth stimulant, auxin, to the decapitated stem, scientists at the Lake States Forest Experiment Station found that formation of large-diameter (springwood) or small-diameter (summerwood) cells is related to auxin production in the growing terminal. They also found they could reverse the change from springwood to summerwood formation by changing the day length to stimulate growth or by changing the auxin supply. The proportion of springwood to summerwood largely controls wood density, which in turn determines most of the strength properties of wood in use, the pulp yield, and other characteristics.

### Site Requirements Defined

The continuing job of determining soil and site requirements for growing the important timber trees of the United States showed good progress. In the sandy soils of the Upper Coastal Plain of Georgia and the Carolinas, growth of slash pine plantations depends on two easily measured soil variables; thickness of the topsoil and depth to a fine-textured (clay) layer. For ponderosa pine in the Black Hills, growth rate can be predicted from the soil depth and various expressions of steepness and direction of slope. For aspen in Minnesota, the important site characteristics for growth are topography, soil texture, depth to water table, and acidity in the subsoil. Cottonwood on alluvial soils grows in relation to soil texture, internal soil drainage, and moisture supply. These studies provide a basis for charts and other simple guides for determining site quality or the choice of tree species for a given area.

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### Controlled Flooding Reduces Hardwood Losses

Impounding the water from fall and winter rains is probably one of the best means to alleviate water shortage on the large flat areas of the South where the rate of soil permeability is slow. Cottonwood, sweetgum, willow, and other hardwoods throughout the South have in the past exhibited dieback and mortality caused by inadequate soil moisture in drought years. Studies in central Mississippi show that 6 to 12 inches of water impounded in September or October and drained in April will increase the moisture stored in the soil and benefit hardwood growth. The sites must be drained promptly in the spring, however, to avoid tree damage.

### Pine Pollen Stored for 15 Years

Creating hybrids between two species or races of trees that flower at different times requires storing the pollen of one parent. Moreover, successful storage of pollen for several years permits researchers to use identical germ plasm year after year in their breeding studies. At the Forest Service's Institute of Forest Genetics in California, pollen of all but one of several pines was still viable after storage for 15 years at 10 percent humidity and at 0° or 5° C.

### Silviculture Modified To Favor Yellow Birch

Increasing the proportion of yellow birch in stands of northern hardwood in upper Michigan will boost economic returns from the stand. This species is in great demand for veneer and the current stumpage price is more than twice that of sugar maple, the next most valuable species. Studies in northern Michigan showed that yellow birch seed supply is usually adequate but that few seedlings become established in lightly cut stands. Silvicultural practices most effective for increasing the proportion of yellow birch in stands were found to be: 1) Reduction of the overstory canopy to let through about 50 percent of full sunlight, 2) scarification to expose mineral soil on at least 50 percent of the area, and 3) a salvage cutting 3 to 5 years after the initial cut to gradually increase the amount of light needed to maintain growth of established seedlings. These measures depart markedly from the selective cutting system commonly used in managing the tolerant species of northern hardwoods.

### Sand Pine Outgrows Scrub Species on Sandhills

Sand pine planted on unprepared sites in the deep sands of western Florida grows well with little or no release from competing vegetation. Eight years after planting, sand pine averaged 13.3 feet in height, slash pine 3.8. Unreleased longleaf, loblolly, and shortleaf pine showed extremely poor survival and growth records. The ability of sand pine to compete successfully with oaks and wiregrass has special significance for sandhills landowners, many of whom are unable or unwilling to pay for the intensive site preparations other species need.

### Planting Methods for Dry Pine Sites in West

The combination of low summer rainfall and relatively coarse, shallow, highly desiccative soils on steep, irregular terrain makes difficult planting sites in central Idaho. Before 1954, attempts to establish plantations of ponderosa pine on the large, unproductive acreage of burned forest sites met little success. Since then, a 5-year study on the Boise National Forest has demonstrated that successful plantations can be established with adequate site preparation and better handling and care of the planting stock. For example, survival after 5 years averaged better than 95 percent on an area prepared by stripping with a D–7 bulldozer and trenching with a Talladega plow, whereas it was about 12 percent on unprepared sites. Use of 2–1 stock, faster transportation from nursery to planting site, and planting in a dug hole rather than in a slit also increase survival. The success of this planting method has stimulated renewed effort in planting pine throughout the ponderosa pine region.

## FOREST FIRE RESEARCH

The 1961 "Bel Air" fire in Los Angeles, Calif., brought home to the Nation the fact that forest fires continue occasionally to overcome the best we have to offer in control methods and capabilities. That these experiences are newsworthy events is testimony to the effectiveness of our present control technology. That they still occur, even occasionally, bears witness to the need for continued effort toward increasing the reliability of modern methods and toward developing new tools and techniques.

### Fire Behavior

The starting point of efforts to explain and predict the way a forest fire may behave is insight into the physical and chemical mechanics of the burning process. This insight may lead also to profitable use of known materials and methods which have not been thought applicable to fire control problems in the past.

Laboratory research revealed a better method of predicting the rate of spread of forest fires from measurements on model fires. Fire spread does not bear a linear relationship to fuel moisture content, as was previously assumed. Spread rates grow progressively more rapid at low moisture contents, indicating a decidedly curvilinear relationship between the two.

### Fire Suppression

The year 1961 brought advances in the use of water and chemical retardants in fighting fires. By learning how viscosity affects the ground pattern of water cascaded from aircraft, researchers have been able to prescribe optimum amounts of

thickening agents to yield desired patterns from drops made at different aircraft speeds and altitudes.

Research has also brought useful information on the penetration of cascaded retardants through tree canopies. In Georgia hardwood timber stands, cascades of less than 440 gallons failed to penetrate in amounts needed to control fire in the forest litter. Investigations also showed that unthickened water does the best job in forest litter, where good penetration is necessary.

### Fire Prevention

Prevention of fire will always be the most potent control measure we can devise. Research effort aimed at improving prevention performance, therefore, becomes more important as forests come under more intensive use and exposure to fire-starting activities.

A survey of 10,000 California hunters has provided useful information about the hunter as a subject of research into prevention methods. Who he is, where he comes from, where he goes to hunt, where he gets his fire prevention information and what he knows or does not know about the use and abuse of fire in the forest have been determined. Armed with such knowledge, researchers are now in a good position to design experimental prevention activities and to evaluate their effectiveness.

## WATERSHED MANAGEMENT RESEARCH

### Chemical Makeup of Soil Affects Erodibility

Why do certain soils erode? A study in California turned up new clues to the reasons and to possible management practices that may help control erosion in problem areas. The presence or absence of certain metallic compounds affects the cohesive properties of a soil. For instance, the greater the concentration of available calcium and magnesium in the soil, the less likely it is to erode. Further study of the basic colloidal properties of forest soils could lead to the development of chemical treatments to alter their natural erodibility.

### Grass Uses Less Water Than Trees

Grass used only about half as much moisture as aspen on controlled plots in a 3-year study conducted on a 9,000-foot-high mesa in Colorado. Both aspen and grass used the same amount of moisture from the first 4 feet of soil; but aspen, with its deeper root system, drew moisture from the 4- to 8-foot layer also, while the grass roots did not reach that far. Further research is expected to show whether conversion from aspen or other forms of forest vegetation to grass will result in greater water yields to streams in areas of deep soils.

### Soil Moisture and Steep Mountain Watersheds

Studies on an artificial soil profile indicate that the base flow of streams in the southern Appalachian Mountains derives from soil moisture drainage rather than from ground-water tables. Following saturation, the soil model drained for 71 days. Soil moisture decreased rapidly at first. After 48 hours, drainage was fairly continuous at all points along the slope but with diminishing moisture content upslope.

This pattern indicates that upslope moisture continually recharges downslope storage, which in turn feeds the narrow streamside ground-water table. Even though 20 percent of the water drained from the soil model in the first 3 days, the small amount draining during the last 50 days was, when multipled by appropriate factors, equivalent to minimum flows from observed watersheds. The study proved to be a significant step toward a better understanding of the basic hydrology of watersheds in the southern Appalachian area.

## FOREST INSECTS

### Biological Control

Continuing studies on natural control of bark beetles have resulted in identification of 14 new species of nematode worms that are parasitic on the beetles. So far, research scientists have not been able to determine fully the effect nematodes have on bark beetle populations. Some, however, are known to reduce the number of eggs laid by infested females by as much as 70 percent. In Colorado, scientists observed that woodpeckers consume up to 98 percent of the overwintering larvae of the Engelmann spruce beetle in small outbreak areas. Large numbers of the northern three-toed, the hairy, and the downy woodpecker were found in areas of local outbreaks during the winter. During the breeding season, the birds dispersed.

Field experiments in the Northeast opened up the possibility of extending the use of the disease-causing organism, *Bacillus thuringiensis*, to the control of the gypsy moth and the cankerworm. Examinations made soon after aerial spraying of 2 pounds of material in 2 gallons of water with tung oil added as a sticker showed that a high percentage of the gypsy moth larvae in the sprayed stands had been killed. Cankerworms were controlled almost completely within 4 days of the spraying.

### Controlling European Pine Shoot Moth in the Northwest

Infestations of European pine shoot moth in ornamental pines can be controlled by a newly developed method—fumigating with methyl bromide. Quarantine and local eradication programs will make use of this method. The insect was recently discovered in the State of Washington, where it threatens native ponderosa pine stands throughout the West.

### Tree Resistance to Insects

The results of recent research in California sup-

port the suggestions that resin is an important factor in pine resistance to bark beetle attack. In studies with several species of beetles, the insects could tolerate resin vapors of their normal host trees, but not those of other trees. The mountain pine beetle was not adversely affected by the resin of hybrid pines when one parent was a nonhost tree. In contrast, the western pine beetle could not tolerate such a combination.

### Measuring Forest Insect Damage

Defoliation of white fir by the Douglas-fir tussock moth not only causes death of many valuable trees but also reduces the growth rate of surviving trees significantly. In California during 3 years of an outbreak, growth rates were reduced 31, 67, and 74 percent in trees suffering from 1–25 percent, 26–50 percent, and 51–99 percent defoliation, respectively. The most heavily afflicted trees recovered growth rate slowly and had not returned to normal 5 years afterwards. Nor did these trees grow as high as those that were not defoliated. Understory trees and reproduction suffered the greatest losses in height growth. Growth losses in trees of sawtimber size amounted to 1,113 board feet per acre in heavily defoliated stands. This loss, plus that from outright killing of trees, totaled more than 12,000 board feet per acre.

Studies are underway into the causes of seed losses in forest seed orchards in the South. Species of thrips, not previously known to attack the flowers and conelets of slash pine, have been found to be the destroyers of up to 20 percent of the seed crop. Adverse weather conditions and physiological factors had been blamed for these losses in the past.

About 10 years ago, ponderosa pine stands in southern Idaho suffered an outbreak of the pine butterfly. An 8-year study of the effect of heavy defoliation of these pines shows that annual growth was 40 percent less than that maintained by nondefoliated trees.

## FOREST DISEASES

### Maple Diseases, Old and New

Maple blight, which has concerned wood-using industries in the Lake States since 1957, has proved to be a noninfectious disease of low present or potential seriousness. An unusual combination of repeated insect defoliations and subsequent reflushing of growth late in the year, followed by fall frost injury, appears to be the basic cause of mortality. All is not well with hard maples yet, however, since one, or perhaps two different diseases are increasing in the Lake States and the Northeast. Federal, State, and industrial agencies are cooperating in studies to determine the exact cause of these maple diseases and develop preventive or control measures.

### Microclimate and Disease

In some situations, microclimatic conditions are so unfavorable that white pine can be safely grown without specific measures for blister rust control, researchers have found. Consequently, it has been possible to drop almost 2 million acres from the ribes eradication program. On other sites, however, the microclimatic hazard is so high that control measures have little effect. Dew alone, for example, provides sufficient moisture to support the rust on ribes in some stream bottoms in northern Idaho. Fortunately, the development of antibiotics has made direct treatment of infected trees possible, and almost 1 million acres of these high-hazard areas can now be added to the blister rust control program.

## RANGE MANAGEMENT AND WILDIFE HABITAT

### Competition Between Grass and Brush

When big sagebrush invades a range, the grass usually suffers. A study on the Benmore Experimental Range in Utah, however, indicates that invasion by rabbitbrush may actually increase production of crested wheatgrass. Scientists searching for the cause of these contrary relationships have found a partial answer in the differing root systems of the two shrubs. Taproots of big sagebrush are frequently restricted by a calcareous hardpan or a salt accumulation in the lower soil layers. To compensate, the plant develops numerous lateral roots in the upper soil, where they utilize all available soil moisture. Crested wheatgrass cannot compete with sagebrush, and barren "halos" appear at the perimeters of shrub crowns. In contrast, dense soil layers have little effect on the taproots of rabbitbrush, and the poorly developed lateral roots offer little competition to roots of crested wheatgrass. Consequently, wheatgrass grows profusely under and adjacent to rabbitbrush. The reason for the actual increase in grass yields when rabbitbrush shares the range is still being studied.

### Growth Inhibitors in Range Plants

Chemicals leached from range plants by rainwater may exert an inhibiting effect on the growth of other plants nearby, recent research has disclosed. In northern Arizona, 20 native range plant species contained chemicals that caused more than a 50-percent reduction in growth of wheat seedlings used as laboratory test plants. Water extracts of grasses caused less inhibition than did extracts of forbs, shrubs, and trees. Some species, such as junipers, produced inhibitory effects under field conditions, whereas grasses did not. Although the presence of a growth inhibitor in a plant is not necessarily of ecological importance, it cannot be ignored in attempts to establish forage species on areas now or formerly occupied by species that produce inhibitors.

### Big-Game Production and Range Condition

A study in the Intermountain area has produced a measure of the importance of summer range for maintaining mule deer herd productivity. A herd on summer range in good condition produced 50 percent more offspring than a herd on very poor summer range. Winter ranges during the period of study were similar in condition.

### Modifying Timber Stand Improves Habitat

Significant increases in understory vegetation of value to deer and upland game for forage and cover resulted from opening the timber stand by logging in Montana, from several levels of thinning in Louisiana, and from stand improvement work in the Central States. Such increases, particularly in shrubby species, improve the habitat and can also be expected to reduce animal damage to timber reproduction.

## FOREST ECONOMICS

### Forest Surveys Cover 59 Million Acres

Forest Surveys conducted in 15 States during the year covered 59 million acres of forest land, in the continuing investigation of the areas, location, and condition of the Nation's forest resources; timber volumes; rates of timber growth and mortality; and timber cut by forest industries. Except for the interior of Alaska, essentially all of the 775 million acres of forest land in the United States has been inventoried at least once. Resurveys to provide up-to-date information and to determine trends in timber supplies, forestry problems, and forest industrial development opportunities are made periodically in all States.

### Future Timber Requirements Studied

Government and industry sources throughout the United States have been furnishing comprehensive information on the use of wood products in FHA-financed residential construction as part of a continuing program to study potential timber requirements. The information showed, for example, that 7 out of 10 FHA-inspected houses in the Nation were of wood-frame wall construction, but 4 out of 10 were built on a concrete slab. These characteristics varied widely, however, across the Nation. When completed, this study will provide information on the amounts and kind of timber products used in house construction and on the ways this use is affected by differences in type of construction, structure size, construction cost, and geographic location.

A pilot study of wood use on farms and rural areas in Missouri indicates an annual consumption per farm of about 1,100 board feet of lumber, 115 wood posts, and 5 cords of fuelwood. Field work on a nationwide survey of wood used by manufacturing industries is almost complete.

### Southeastern Forest Resources Show High Potential

Forest lands capable of producing commercial timber cover some 38 million acres, or two-thirds of the total area, of the Southeast River Basins, a region of 90,000 square miles including most of Georgia and parts of surrounding States. An analysis of potential timber supplies and forest industrial development, prepared for the Southeast River Basin Study Commisison, shows that annual timber growth in the region may be expected to increase from 1.3 billion cubic feet in 1960 to 1.5 billion in 1975 and 1.9 billion by the end of the century—if proper management is maintained. This projected growth could support large increases in pulp and paper manufacture and other wood-based industries in the basins. If all the potential growth were utilized, employment in 2000 could be about 50 percent higher than in 1958 and payrolls more than tripled.

### Timber Salvage by Advance Roading

Current mortality on some 3 million acres of old-growth Douglas-fir timber lands in the Pacific Northwest approximates 1 billion board feet annually. Constructing roads well in advance of final harvest is economically practicable in many stands, according to a newly completed study. Interest, maintenance charges, and depreciation on the capital outlay for such roads can be met in most cases from returns obtained from timber salvage. The principal factors affecting net returns from advance roading include timber quality and degree of stand decadence, species composition, and the costs of salvage logging as affected by accessibility and salvable volume.

## FOREST PRODUCTS UTILIZATION

### Western Timber Industry Joins in Research on Wood Quality

The lumber and plywood industries have agreed to contribute more than $300,000 during the next 3 years to accelerate research by the Forest Products Laboratory on strength properties of western species. The urgency of this work results from recent expansion in uses for structural purposes of many trees formerly little utilized. The studies will provide research-based factors for use in engineering computations. The West Coast Lumbermen's Association, the Western Pine Association, and the Douglas-Fir Plywood Association have joined as sponsors of this work.

### Fire Safety of Wood

Basic research aimed at developing optimum fire-retarding treatments for wood included work on the mechanics of wood pyrolysis—chemical decomposition by the action of heat. This study, which involved activation energies for untreated and treated wood and the chemical composition

of products of pyrolysis, has suggested both new and modified fire-retardant treatments for wood. Additional exploratory studies examined the effect of presently available fire-retardant treatments on wood strength.

### Log Grades for Southern Pine

The Forest Service has devised and adopted as standard an improved log grade system for southern pine that permits more accurate estimates of the value and yard lumber outturn of the logs. The new system is the product of extensive research in Mississippi, Georgia, Texas, Florida, Arkansas, and South Carolina. Further research will attempt to develop methods of estimating total value and product outturn of standing trees in the southern pine region.

### Slicing Wood Eliminates Sawdust

Efforts to reduce wood losses to sawdust in veneer production included studies on slicing. Thick veneers up to ½ inch were sliced successfully and their utility was evaluated in a number of products. Manufacturers of wood-processing machinery are interested in this development and are exploring the possibility of joint sponsorship to develop a commercial process.

### New Concept for Making Strong Paper

A new concept for making strong paper combines long-fibered softwood pulp and short-fibered hardwood pulps to provide both tear and puncture resistance more economically than in the past. Today's processes usually involve working the long fibers of softwoods to a point where the ends are frayed and small fragments develop. Short-fibered hardwood is used chiefly as a filler. The new method requires less working of the long fibers and added working of the already short hardwood fibers. Demonstrations show that the new process results in better pulps with high tear resistance (associated with long fibers) and good puncture resistance (formerly achieved by breaking down the long fibers). This should result not only in better quality paper but also should promote more use of low-value hardwoods.

## FOREIGN FORESTRY SERVICES

During the year, work consisted primarily of training foreign nationals; technical consultation and support for United States specialists serving abroad as forestry, range, and watershed advisors; and participation in international organization activities. The Forest Service performed most of these foreign forestry services through cooperative arrangements with the Agency for International Development (AID), formerly the International Cooperation Administration (ICA).

### Training Foreign Nationals

The Foreign Training Branch prepared, or helped prepare, 138 training programs and study tours for 215 foreign nationals from 56 countries. In addition, it prepared refresher programs of 2 to 6 weeks' duration for six AID advisors on home leave, to acquaint them with recent developments in their field of specialization. The total of 144 programs included 124 for individuals and 20 for teams of from 2 to 11 persons with 97 participants.

The Agency for International Development sponsored 75 programs for 126 visitors; the Food and Agriculture Organization (FAO) of the United Nations sponsored five programs. The remaining 64 programs for 90 individuals were "nonproject," i.e., were sponsored by the U.S. Department of State, various international organizations, foreign governments, and in a few cases by the individuals themselves.

These programs provided training in a wide variety of forestry and related fields: 34 in forest management, 30 in forest products utilization, 27 in general forestry, 13 in forest engineering (including forest road construction, logging, and equipment maintenance and repair), and 11 in forest economics. The remaining programs covered range management, watershed management, forest protection, forest recreation and wildlife, and administrative management.

Sixty-three participants came from Asia, 54 from Europe (primarily nonproject), 35 from Africa, 25 from the Philippines, and 23 were from South and Central America. The remaining foreign participants came from Australia, Japan, Jamaica, and Haiti. As part of their training programs, 48 foreign nationals were registered for academic training at educational institutions in the United States at the beginning of the 1961 fall term. Forest Service personnel spent a total of 2,688 man-days in preparing and carrying out training programs for the 131 persons sponsored by AID and FAO.

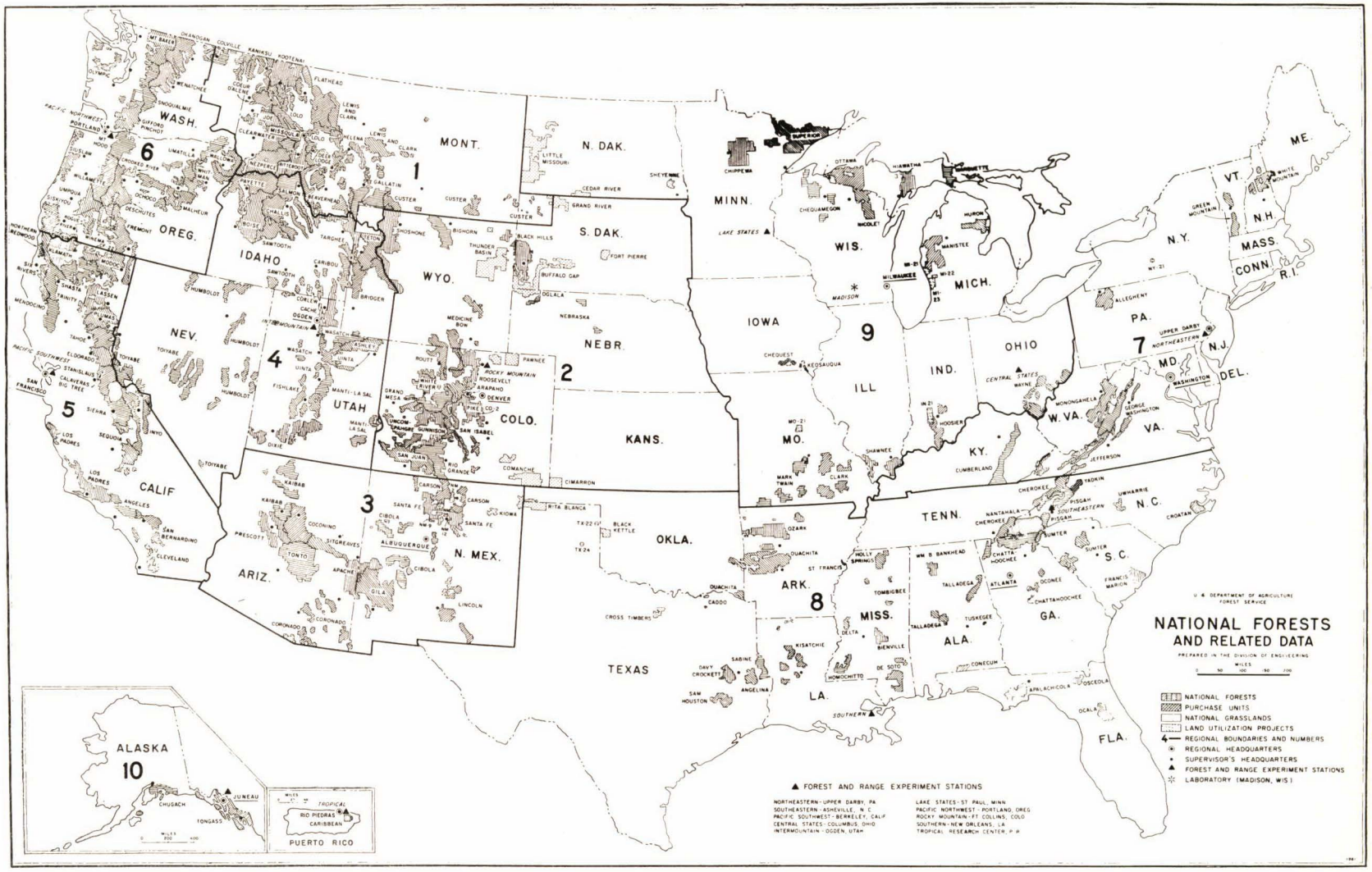
### Technical Consultation and Support

The overall volume of technical backstopping, recruitment, and other activities continued at about the 1960 level even though the number of requests declined somewhat. The Administration's increased emphasis on assistance to Latin American countries brought a marked increase in the volume of requests from that part of the world. Inquiries from Latin America for the second half of the year accounted for 46 percent of the total for all world regions and was twice as great as for the first half.

During the year a total of 120 inquiries were received from 42 countries, and assistance was given for the recruitment of personnel for 11 overseas positions. Additional services to AID included assistance in procuring seed and pollen, lumber inspection, orientation and other assistance to foresters leaving for new assignments, end-of-tour interviews with forestry advisors, publication of a lumber seasoning manual with arrangements for a Spanish edition, and distributing forestry publications for AID foresters abroad.

**International Organization Activities**

The volume of work involving international organizations increased to the point where a full-time staff assistant was assigned responsibility for arranging Forest Service participation in international conferences, preparing position papers, responding to requests for information, and assisting in work connected with the publication of the Proceedings of the Fifth World Forestry Congress.


NATIONAL FORESTS
AND RELATED DATA
PREPARED IN THE DIVISION OF ENGINEERING
U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
NATIONAL FORESTS
PURCHASE UNITS
NATIONAL GRASSLANDS
LAND UTILIZATION PROJECTS
REGIONAL BOUNDARIES AND NUMBERS
REGIONAL HEADQUARTERS
SUPERVISOR'S HEADQUARTERS
FOREST AND RANGE EXPERIMENT STATIONS
LABORATORY (MADISON, WIS.)
▲ FOREST AND RANGE EXPERIMENT STATIONS
NORTHEASTERN - UPPER DARBY, PA.
SOUTHEASTERN - ASHEVILLE, N. C.
PACIFIC SOUTHWEST - BERKELEY, CALIF.
CENTRAL STATES - COLUMBUS, OHIO
INTERMOUNTAIN - OGDEN, UTAH
LAKE STATES - ST. PAUL, MINN.
PACIFIC NORTHWEST - PORTLAND, OREG.
ROCKY MOUNTAIN - FT. COLLINS, COLO.
SOUTHERN - NEW ORLEANS, LA.
TROPICAL RESEARCH CENTER, P. R.
ALASKA
10
JUNEAU
CHUGACH
TONGASS
TROPICAL
RIO PIEDRAS
CARIBBEAN
PUERTO RICO
1 MONT.
2 NEBR.
3 N. MEX.
4 UTAH
5 CALIF
6 OREG.
7 PA.
8 ARK.
9 ILL
N. DAK.
S. DAK.
WYO.
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ALA.
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TEXAS
OKLA.
ARIZ.
FLA.

# National Forest Resource Management

The increasing needs of America's growing population apply more strongly than ever to the resources of the National Forests and National Grasslands. Though National Forest land area remains about the same, the demand for resources grows steadily. The National Forests must provide outdoor recreation opportunities for millions of new visitors each year; they must support a large and healthy wildlife population; and they must yield more water to satisfy the needs of agriculture and constantly expanding cities and industries; timber and range resources must become more productive than ever.

The Forest Service has anticipated America's growing resource requirements, and has developed plans to meet those requirements through intensive multiple use resource management, as required by the Multiple Use-Sustained Yield Act of June 12, 1960. Several specific new developments demonstrate the Forest Service's emphasis on multiple use management; they are: The Development Program for the National Forests, establishment of the Advisory Committee on Multiple Use, and a servicewide Multiple Use Work Conference.

### A Development Program

In September 1961, President Kennedy sent to Congress the Development Program for the National Forests, which expands and brings up to date the Program for the National Forests that was sent to Congress in 1959. The new program incorporates several additional major needs that have been subsequently recognized in the light of recent trends and surveys.

Specific changes include:

1. Increased estimates for the recreation resource management and development activity to meet revised estimates of public needs.
2. An increase in timber resource management activity to reflect the greater harvest of 13 billion board feet annually by 1972 (instead of 11 billion board feet) and higher standards of timber sale administration.
3. An increased multiple-purpose road and trail construction program to provide particularly for higher estimates of recreation use and increased timber harvest.
4. The inclusion of a land purchase program to acquire key tracts of private lands inside National Forest boundaries to facilitate and protect resource use, particularly in key recreation areas.

The accomplishments of the Development Program over the next 10 years will largely determine whether or not National Forests will contribute their fair share to a greatly expanded national economy by the year 2000.

### Citizens' Committee on Multiple Use

Early in the year a new Advisory Committee on Multiple Use was organized to advise the Chief and his staff on various problems relating to the management of these public forests. The committee membership consists of 15 prominent citizens noted for their interest in natural resource conservation.

The advisory committee held two meetings during the year. The first was in Washington, D.C., on May 2; it considered problems created by the rapid increase in recreational use of the National Forests, and steps necessary to meet the needs. The second meeting was at Winter Park, Colo., September 6–8. It considered 1) problems involved when timber management methods involving clear-cutting are applied on areas visible from main roads and recreation areas, and 2) problems created when resource management for increased water yield modifies management for recreation, timber, wildlife, and livestock forage. The committee's reactions to Forest Service programs and its suggestions helped the Service to understand more clearly the needs, attitudes, and desires of the general public.

### Multiple Use Work Conferences

The first servicewide Multiple Use Work Conference was held in April 1961, in Denver, Colo. Purposes of the conference were to obtain a clear, mutual understanding among all regions of multiple use planning and application; to appraise different approaches in terms of adequacy and suitability; and to agree on policies and standards for inclusion in the Forest Service Manual and Handbook.

In June and July the Multiple Use handbook and manual were completed. By the end of 1961 all regional multiple use plans and 75 percent of the Ranger District plans were completed.

In addition to these developments, the Forest Service vigorously continued the on-the-ground management of the natural resources within each of the National Forests and National Grasslands.

## WILDLIFE MANAGEMENT

National Forests and National Grasslands are not only excellent homes for wildlife, but prime

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hunting and fishing country for America's sportsmen. There were over 24 million sportsman visits to these public lands in 1961—nearly 16 million visits primarily for fishing and 8½ million visits for hunting. This represents a 10 percent increase over 1960.

Approximately 2 million hunters harvested 682,000 big-game animals on National Forest lands during the year, or one-third of all big-game animals taken in the United States. The harvest amounts to 15 percent of the estimated 4.4 million big-game animals living all or part of the year on the National Forests and Grasslands; the harvest is still well below the annual increase of game population.

The National Forest System provides 186 million acres of public land for hunting and fishing in accordance with State laws. Fishermen have access to 81,000 miles of streams and nearly 2 million acres of lakes and reservoirs. Sportsmen taking advantage of these opportunities accounted for one-fourth of all recreation visits on National Forests and Grasslands. Many other visitors enjoyed watching or photographing wild animals in their natural habitat.

### Habitat Improvement

Abundance of fish and wildlife for public enjoyment depends on favorable habitat conditions. Mammals, birds, and fishes must have foods of the right kind and abundance, protective cover for shelter and escape, water of high quality and ample distribution, suitable breeding places, and reasonable protection from natural predators and man. These requirements are considered in the management of forests and ranges.

Forest Service efforts to improve wildlife values involve the coordination of other resource uses with wildlife needs, cooperation with State fish and game authorities and other agencies, and direct habitat improvement projects to meet specific objectives.

Through the efforts of biologists, rangers, and other land managers, in cooperation with State game and fish agency personnel, wildlife management activity has been greatly intensified on National Forests. Biologists have been assigned to a number of National Forests to develop plans and to train rangers and other personnel in land management coordination techniques. Cooperation is excellent between the Forest Service and the 41 States in which there are National Forests and National Grasslands, with the result that the land (the responsibility of the Forest Service) and the wildlife (the responsibility of the States) are both managed for the greater benefit of the American people.

### Direct Projects

Increased financing for direct habitat improvement projects has permitted significant strengthening of wildlife management programs, beyond what can be accomplished solely through coordinated land management. Direct projects greatly improved 70,000 acres of game habitat in 1961. Projects included the clearing of permanent openings (2,600 acres), prescribed burning (37,650 acres), fencing and revegetation of key areas (29,420 acres), and 280 small water developments.

Direct improvement work has improved fish habitat on 56 miles of fishing streams; this work includes bank stabilization and removal of obstacles to fish migration (17 miles), structural stream improvements (20 miles), fencing stream bottoms (13 miles), and rough fish removal (6 miles). About 1,700 acres of fishing lakes were improved: 335 acres by fertilization and 1,370 acres by water level stabilization. Also, 25 small flow-maintenance impoundments were repaired or constructed.

Wildlife on the National Forests also benefits from State projects; State agencies recognize the exceptional opportunities for development of wildlife habitat on National Forests, and improve habitat through additional direct measures. Often State participation in direct projects exceeds the work that could be done solely with funds available to the Forest Service. These projects benefit numerous species of wildlife, including many types of nongame animals, birds, and fish.

## TIMBER MANAGEMENT

In spite of a depressed timber market, National Forest timber operations in 1961 showed encouraging progress. Volume of timber cut, though lower than in 1960, was still the second highest on record, and reforestation work approached the level achieved by the Civilian Conservation Corps.

### Inventories and Management Plans

Regular review of inventories and management plans for the 380 National Forest working circles has permitted a steady increase in the annual allowable cut in recent years. Increases are possible under a sustained yield policy because the updating of inventories and plans (at 10-year intervals) brings to light new information on growth, reproduction, protection, reforestation, stand improvement, access, utilization, and inventory methods. Total allowable annual cut has increased from 9.1 billion board feet in 1956 to 11.2 billion board feet in 1961.

### Timber Cut and Sold

Timber cut from National Forests during fiscal year 1961 totaled 8.4 billion board feet, a decrease of 1 billion board feet from 1960. Receipts amounted to $98.4 million, a decrease of $41.5 million from 1960. Volume of timber sold during fiscal 1961 totaled 8.9 billion board feet, a reduction from the previous year of 3.3 billion board feet. These reductions in timber volumes and receipts were, in large part, due to a pronounced

drop in demand for lumber and other forest products during the year.

Depressed markets for lumber and other forest products and lack of timber access roads, particularly in the West, again were major factors in preventing harvest of the full allowable cut of 11.2 billion board feet in 1961. Progress in past years in meeting sustained-yield allowable cut objectives is summarized below.

| *Fiscal year* | *Sustained-yield annual allowable cut (billion board feet)* | *Actual cut* | *Percent of allowable cut harvested* |
|---|---|---|---|
| 1956 | 9. 1 | 6. 9 | 76 |
| 1958 | 10. 2 | 6. 4 | 63 |
| 1960 | 11. 0 | 9. 4 | 85 |
| 1961 | *11. 2 | 8. 4 | 75 |

*9.6 billion bd. ft. sawtimber and 1.6 billion bd. ft. products of less than saw-log size.

### Reforestation and Stand Improvement

The reforestation accomplishments in fiscal year 1961 previously were exceeded only by the record high established by the Civilian Conservation Corps in 1936. Fifteen Forest Service nurseries produced 140 million trees for the 1961 program. New nurseries are being developed in four western Regions and seedling production is being increased in all nurseries to supply an expanding reforestation program.

Major accomplishments in reforestation and timber stand improvement are shown in the following table.

| | *Acres treated* | | |
|---|---|---|---|
| | *Financed under Forest Land Management appropriation* | *Financed with deposits from timber sales* [1] | *Fiscal year 1961 total* |
| Planted or seeded | 69, 838 | 93, 226 | 163, 064 |
| Measures to obtain natural regeneration (scarifying, burning) | 41, 165 | 36, 371 | 77, 536 |
| Plantation release | 26, 461 | 19, 757 | 46, 218 |
| Weeding, thinning, and cull tree treatment (natural stands) | 48, 526 | 375, 111 | 423, 637 |
| Pruning and crop tree release | 2, 565 | 79, 987 | 82, 552 |

[1] Funds collected from timber sale operators under the Knutson-Vandenberg Act of June 9, 1930 (16 U.S.C. 576b).

Effective measures were also taken on a gross area of more than a half-million acres to protect young natural and planted or seeded timber stands from severe damage by domestic stock, town ants, rodents (especially porcupines), and other forms of wildlife.

## OUTDOOR RECREATION

National Forests continue to play the major role in providing outdoor recreation opportunities for the Nation. For the first time, recreation visits exceeded a hundred million, the actual tally being 102 million visits in 1961, representing 110 million visitor-days use. This is an increase of 9.3 million visits, or 10 percent above 1960, and almost four times the number in 1950.

The 1961 increase is typical of the recreation popularity of National Forest areas, and a growing public appreciation of improved and new facilities provided through the intensified development of National Forest recreation resources.

Outdoor recreation opportunities in the National Forests are extensive and varied, covering a maximum range of healthful outdoor activities. These activities include: Picnicking, fishing, hunting, camping, skiing, swimming, hiking, riding, or just quiet enjoyment of forest and wilderness scenery. Growth of National Forest recreation activities can be seen in the tabulation at the bottom of this page.

### Call of the Wilderness

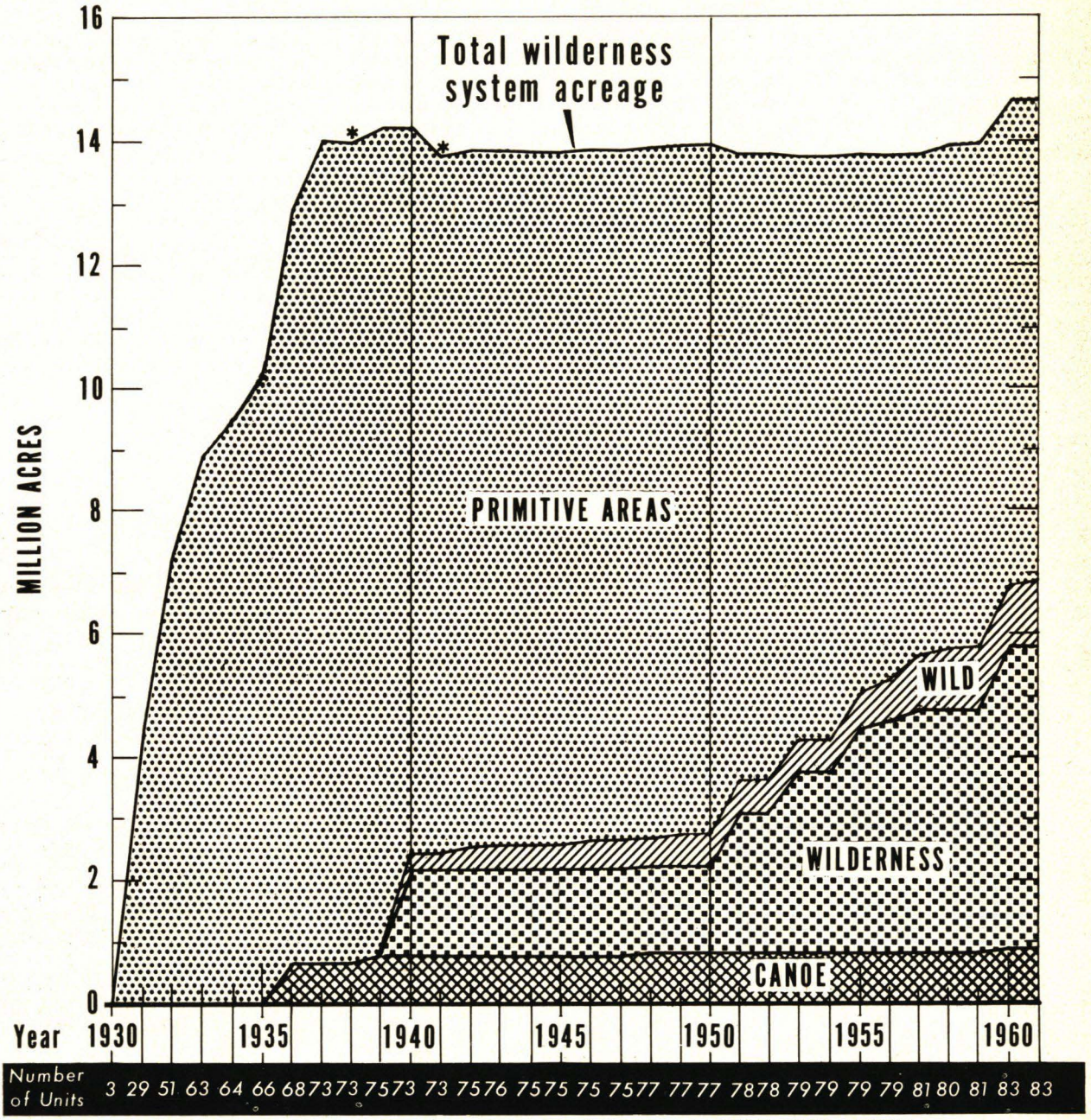
National Forests include many fine areas predominantly valuable for their natural or wilderness characteristics. At the end of 1961 the number and extent of such areas being protected and managed to preserve their natural environment are as follows:

| | *Number* | *Acres* |
|---|---|---|
| Wilderness Areas | 14 | 4, 888, 173 |
| Wild Areas | 30 | 1, 047, 553 |
| Primitive Areas | 38 | 7, 852, 959 |
| Canoe Area | 1 | 886, 673 |
| Total | [1] 83 | 14, 675, 358 |

[1] In 14 States.

| Primary purpose of visit: | *1961* | *1960* | *1955* | *1950* |
|---|---|---|---|---|
| General enjoyment of forest environment | 34, 689, 000 | 30, 181, 000 | 12, 444, 000 | 7, 969, 000 |
| Picknicking | 20, 076, 000 | 19, 497, 000 | 10, 883, 000 | 6, 326, 000 |
| Fishing | 15, 986, 000 | 14, 534, 000 | 8, 278, 000 | 4, 885, 000 |
| Hunting | 8, 535, 000 | 7, 951, 000 | 4, 064, 000 | 2, 285, 000 |
| Camping | 6, 924, 000 | 6, 597, 000 | 2, 769, 000 | 1, 534, 000 |
| Winter sports | 4, 404, 000 | 4, 499, 000 | 2, 723, 000 | 1, 517, 000 |
| Swimming | 3, 013, 000 | 2, 801, 000 | 1, 368, 000 | 902, 000 |
| Hiking and riding | 2, 249, 000 | 2, 018, 000 | 1, 053, 000 | 635, 000 |
| Organization camping, canoeing, scientific study, hobbies, wilderness, etc | 6, 036, 000 | 4, 876, 000 | 2, 130, 000 | 1, 315, 000 |
| Total | 101, 912, 000 | 92, 594, 000 | 45, 712, 000 | 27, 368, 000 |

# Growth of National Forest Wilderness System, 1930--1961




*DECREASE PRIMARILY DUE TO MAJOR LAND TRANSFER TO NATIONAL PARK SERVICE.

Under the active program of reclassification of primitive areas, which is scheduled for completion by 1970, two areas were reclassified in 1961. The Caribou Peak Primitive Area on the Lassen Forest in California was reclassified as the Caribou Wild Area under regulation U–2. The La Garita-Sheep Mountain Primitive Area on the Gunnison and Rio Grande Forests in Colorado was reclassified and renamed the La Garita Wild Area under regulation U–2. In both cases minor boundary adjustments were made.

Other actions were in process at the close of 1961. Public hearings have been held on reclassifying the Selway-Bitterroot Primitive Area on the Lolo and Bitterroot Forests in Montana and the Clearwater and Nezperce Forests in Idaho. The proposed action would establish this area as wilderness under regulation U–1.

Actions have also been started to reclassify two other primitive areas as wilderness areas under regulation U–1. These are the Mt. Dana-Minarets Primitive Area on the Inyo and Sierra National Forests in California, and the Anaconda-Pintlar Primitive Area in the Beaverhead, Deerlodge, and Bitterroot Forests in Montana.

Action is underway to establish the Domeland Wild Area on the Sequoia Forest in California under regulation U–2.

### Improving Recreation Facilities

Five years ago the Forest Service started a program to provide satisfactory sanitation, cleanup, and care of existing recreation sites, and to develop new facilities to meet anticipated needs. The original 5-year program, known as Operation Outdoors, has been incorporated into the Development Program for the National Forests, which calls for intensive development of all National Forest resources to serve the greatly increased demands now and in the future.

Although recreation use has been 50 percent greater than originally expected, the Forest Service has adequately maintained and serviced existing recreation sites and areas. Development of new recreation facilities has progressed somewhat more slowly; nevertheless, 14,000 family camp and picnic units have been rehabilitated and about 12,000 new units constructed. During the current year rehabilitation is planned for an additional 9,800 units and new construction planned for 3,200 units. Rehabilitation and new construction will continue, under the Development Program, to provide adequate recreation facilities for public use and enjoyment.

### Recreation Planning

The Forest Service is preparing an analytical report on the results of its detailed National Forest Recreation Survey, which was completed in 1960. The survey included an estimate of National Forest acreage which would be needed to satisfy public recreation requirements by the years 1976 and 2000, and an inventory of lands suitable and available to meet such needs.

When the final report is completed, it will define the role of the National Forests in meeting past, present, and future demands of the American people for camping, picnicking, swimming, boating, wilderness, and other forms of outdoor recreation. Specifically, the report will review the historical background and development of recreation on the National Forests; discuss the kinds of recreation provided, trends in use, and the nature of present and prospective problems; analyze future recreation demand; consider the need for coordination of National Forest uses; appraise the recreation resource supply outlook; and conclude with policy and program recommendations, including a program for needed recreation research.

Currently the Forest Service is preparing recreation management plans for each National Forest, to be completed by fiscal year 1964. These plans will contain programs for the development of recreation sites and establishment of recreation areas at places and times calculated to satisfy anticipated needs in an orderly manner. Detailed management plans for individual recreation areas within each National Forest will be prepared concurrently. Area plans will contain functional guidance necessary for full utilization of the recreation resource within the framework of multiple use policies and in line with the objectives of the Development Program for the National Forests.

## SPECIAL USES

The Forest Service issues permits to individuals, companies, or agencies for more than 100 kinds of special uses on National Forests and Grasslands. As of June 30, 1961, there were more than 60,000 special use permits in effect for over 4,225,000 acres. There are also some 18,000 acres under special use permits on lands still administered as land utilization projects. These permits provide for telephone line rights-of-way, schools, cabins, churches, resorts, winter sports areas, landing fields, and other uses.

Besides their commercial and utilitarian value, special use facilities provide for public and private enjoyment of the National Forests and National Grasslands. More than 500 resorts, 183 winter sports areas, and 770 organization camps make an important contribution to National Forest recreation. They supplement the many types of free recreational use: Camping, picnicking, hiking, riding, mountain climbing, and scenic and esthetic enjoyment.

No charge is made for permits involving public use, and for many types of organizational use only nominal fees are required. Those obtaining permits for commercial or private use must pay a fee commensurate with the value of the land for such use. Total special use receipts for fiscal year 1961 were $1,636,912. Recreation uses, including com-

mercial public service facilities and recreational residences, accounted for $1,223,227; power permits brought in $72,504; and other land uses accounted for $341,180. The aggregate increase was $116,515 over fiscal year 1960.

### Mineral Leases, Mining, and Surface Rights

There are 10,553 mineral leases and permits in effect on National Forests and Grasslands reserved from the public domain. Although the estimated $10,000,000 in revenue from these leases (collected by the Interior Department) are not included in National Forest receipts, the Forest Service manages the surface resources on the more than 14 million acres affected. On all acquired lands under Forest Service jurisdiction, the mineral receipts totaled $2,076,950; these receipts represent the revenue from some 4,200 mineral leases and permits, including oil and gas leases, covering 3½ million acres.

Determination of surface rights on mining claims under the multiple use mining law moves ahead rapidly. At the end of 1961, field examination had been completed in 812 areas totaling 119,348,805 acres. This represents completion of approximately 87 percent of the work to be done. A total of 19,505 mining claims have been included in verified statements; these constitute only about 2 percent of the estimated claims on the area covered.

Surface rights procedure has been completed on 388 areas, totaling 53,026,212 acres containing an estimated 422,406 mining claims. A total of 4,947 claims were included on verified statements, of which 4,116 claims were withdrawn by the claimants and 189 claims not upheld at hearings before a Bureau of Land Management hearing examiner. For 642 claims the Forest Service stipulated that the asserted surface rights were valid.

## WATERSHED MANAGEMENT

From the National Forests flow some of the best, and often the only dependable supplies of water for many communities, particularly in the West. The Forest Service protects the watersheds on these public lands, and where needed, it rehabilitates damaged and eroding land. Where public water needs are critical and natural conditions permit, the Forest Service may take positive action to increase water yields by artificial means discovered through research. Water storage facilities within the National Forests require close coordination between the Forest Service and other Federal, State, and local agencies for the best multiple use management of the resources affected by such developments.

### Watershed Rehabilitation

During the year considerable progress was made toward reducing the backlog of rehabilitation work on the National Forests and Grasslands. Over 100,000 acres of deteriorated watersheds and nearly 1,000 miles of eroding stream channels and old roads were treated for watershed improvement purposes. Emergency action was taken to protect all recently burned-over areas where there was a threat of serious watershed deterioration. These restoration and rehabilitation activities included projects on 122 National Forests and National Grasslands.

### Impact Surveys

Located within the National Forests are some of the most desirable remaining reservoir sites for flood control, hydroelectric power, irrigation, and other purposes. As more and more of these sites are selected for development, the Forest Service must conduct surveys to find ways to minimize adverse effects and to enhance the beneficial effects that these reservoirs will have on National Forest values. During 1961, surveys were completed on 29 projects and work was underway on an additional 35.

### Watersheds and Land Use

The Forest Service continues to find new ways to develop water resources and to prevent erosion by means of special projects on the National Forests and Grasslands. Information gathered from these projects contributes to the wider application of sound watershed management methods to all water-producing lands.

The Beaver Creek Project on the Coconino National Forest seeks to determine the effects on water yield, water quality, and erosion rates of different methods of modifying the vegetative cover. The particular methods being studied are: Silvicultural modification of ponderosa pine stands, juniper eradication, conversion of low-productivity stands to grassland, and fuel reduction and thinning through controlled burning. Stream gaging stations will measure the results of these treatments as well as the results obtained where no treatments are applied.

In New Mexico, on the Santa Fe National Forest, the Forest Service is cooperating with the U.S. Geological Survey, the Interstate Stream Commission, and the State in the measurement of water yield data from watersheds with varying hydrologic characteristics. Plans call for installation of gaging stations on 15 different watersheds in the Sangre de Cristo Mountains. Information gained will be used to estimate water yield and other data on similar watersheds throughout the region.

On the Tahoe National Forest, the Forest Service, the Geological Survey, and the University of California are studying the effect of various burn rehabilitation treatments on the hydrological functioning of small watersheds within the Donner Ridge burn of 1960. On the Sierra National Forest an administrative study is underway to determine what effect contour felling of snags has

in the reduction of soil erosion on steep, burned-over slopes.

Other projects include: Special study of the use of gabions, groins, sills, and other structures for channel stabilization purposes on the White Mountain and George Washington National Forests; sand dune stabilization by vegetative means on the Siuslaw and Lower Michigan National Forests; and on the Panhandle National Grasslands, Texas, a cooperative study with a subsidiary of the Standard Oil Company to determine the effectiveness of a mulch derived from petroleum processing residues for sand dune stabilization.

### Forest Soils Program

A handbook on soils as related to National Forest management was published and distributed to field offices in 1961. The forest soils program continued with the completion of soil surveys on 1.5 million acres of National Forest land during the year. Forest Service soil surveys have now been completed on a total of almost 5 million acres.

## RANGE MANAGEMENT

Forage from the National Forests and National Grasslands helps some 20,000 ranchers and farmers to round out their yearlong livestock operations. The 63 million acres of Forest Service-administered range provided summer grazing for 1.3 million cattle and 2.5 million sheep during fiscal year 1961. For this privilege 17,000 permittees on the National Forests paid an average of 46 cents per animal month for cattle and 8¾ cents for sheep. Grazing fees paid by 2,500 permittees on the National Grasslands averaged 85 cents for cattle, and 17 cents for sheep. Total receipts for livestock grazing on all Forest Service lands amounted to $3,898,497, of which $974,624 was returned to the counties in which the rangelands were located.

### Special Studies

At the direction of the Congress, the Forest Service and the Bureau of Land Management in the Department of the Interior have jointly undertaken a trial program of public rangeland appraisal. The program involves the gathering of information on conditions, trends, grazing capacity, range improvements, and related data on sample public land areas in Colorado, Montana, and Oregon. Two objectives have been set up: 1) To assemble a report illustrative of the kind and type of information obtainable from a nationwide range appraisal of public lands, and 2) to develop a prospectus for a public rangeland appraisal, including costs. The second phase will consist of an inventory and analysis of range condition, trends, and related information, and projection of demands that can be expected to affect public rangeland management.

The field inventory has been completed and the analysis is in progress. Also completed are preliminary projections of range livestock, wildlife, outdoor recreation, water, and timber demands than can be expected to affect management of the Federal range. A concluding section will deal with the impact of these demands on Federal range management.

In addition to the public rangeland appraisal, the Forest Service and the Bureau of Land Management are jointly sponsoring a study of western livestock operations using public rangelands. This study is being conducted by the Economic Research Service in the Department of Agriculture. Information has been gathered on over 700 sample livestock operations, and budgets have been prepared by the ERS representing 75 different ranch situations. The study will be used to develop some solutions to basic land management problems common to both agencies.

### Range Allotment Analysis

The Forest Service's current range allotment analysis and management planning program continues to provide up-to-date information on range conditions and capabilities; knowledge gained provides a sound basis for on-the-ground decisions necessary to wise multiple use management of range resources. During fiscal year 1961, this program moved ahead aggressively; work equivalent to the completion of 1,069 allotment plans was accomplished during the year, bringing the initial analysis and planning work to 43 percent of completion for the 11,327 Forest Service grazing allotments.

Knowledge gained by range analysis has already produced benefits in the management of Forest Service rangelands. New management systems, including rotation plans for grazing, have been installed that will bring the range into better condition. Allied to improved grazing plans are a number of range improvement programs that permit better land management and produce increased livestock returns.

### Range Improvements

Structural range improvements and range rehabilitation measures are some of the principal means for implementing range management systems. Structural improvements consist primarily of fences and stock water developments; in 1961, 1,268 miles of fence were constructed and 1,355 stock watering places developed. Rehabilitation and improvement measures involve many considerations; in 1961, 26,930 acres of National Forest rangeland were rehabilitated, using agronomic methods of seeding. On 166,049 acres, undesirable plants were removed and seeding accomplished, using methods varying from application of herbicides to grubbing with power equipment. Water spreading measures were devolped on 2,560 acres. Range-destroying rodents were controlled on 82,627 acres, and noxious farm weeds were controlled on 4,034 acres.

# National Forest Protection and Development

Management of National Forests and National Grasslands depends heavily on several important Forest Service programs. These are: Protection from fire, insects and disease; engineering work for mapping, surveying, and construction of roads, buildings, airfields, and other facilities; and purchase, exchange, and classification of lands for more effective administration. Progress in these areas of activity will be reflected for years to come in the greater abundance of more readily accessible resources for the use and enjoyment of the American people.

### Weeks Law Anniversary

National Forest protection and development activities look primarily to the future, yet in 1961 occasion was also taken to look back over the past. Two celebrations were held in September and October to honor the Golden Anniversary of the Weeks law of March 1, 1911. The first celebration, sponsored by the North Carolina Forestry Association (also that Association's fiftieth anniversary), was held at Asheville, N.C., on September 26–27. The other celebration was held at Crawford Notch, N.H., on October 6–7, under the joint sponsorship of the Society for the Protection of New Hampshire Forests and the Appalachian Mountain Club.

These ceremonies emphasized the great public benefits that have accrued as a result of the enactment of the Weeks law: more than 20 million acres of timber and watershed lands were acquired for new National Forests, mainly in the East; a system of cooperative forest fire control was established for State and private lands; and a precedent was set for many later cooperative programs in natural resource conservation.

At the Asheville ceremonies, Secretary Freeman made the principal address, and broke ground for the Cradle of American Forestry Museum to be built in the Pink Beds section of the Pisgah National Forest. Ceremonies on the second day took place on the first tract of land acquired under provisions of the Weeks law; there a plaque was unveiled dedicating the tract to the memory of Dr. Chase P. Ambler, an early conservation leader in the movement to establish forest reserves in the East.

The Crawford Notch ceremonies took place near the birthplace of Congressman John Weeks, and within another Weeks law forest, the White Mountain National Forest.

## NATIONAL FOREST FIRE CONTROL

### 1961 Fire Record

The National Forests and Grasslands experienced an extremely severe fire year in 1961, yet the year gave some cause for encouragement. The total of 15,159 fires during the year was the greatest number since 1940. The 10,576 lightning-caused fires that occurred during the year set an all-time record, contrasting dramatically with the 5-year average of 6,191 lightning fires and the previous record of 8,902 lightning fires in 1940. The encouraging signs included a drop in the number of man-caused fires from 5,164 in 1960 to 4,583 in 1961, and a total of 224,000 acres burned, which is 200,000 acres less than the area burned in 1960 and nearly 10 percent less than the 5-year average of 245,660 acres.

### Firefighting Deaths

No loss from forest fire can compare with the loss of human life; 19 men died fighting forest fires during the year. Nine were killed in five aircraft accidents. Four of these were pilots employed by contractors and five were employees of the Forest Service. On the ground, nine temporarily employed firefighters were killed: three by falling snags, three in motor vehicle accidents, two burned to death, and one died from heat exhaustion. One member of a Forest Service suppression crew died from burns suffered several weeks earlier.

### The Fire Season

The third successive year of severe drought intensified the fire danger throughout much of the West. The most critical National Forest areas were in South Dakota, Idaho, Montana, Utah, Nevada, southern California, Arizona, and New Mexico. The cumulative effect of prolonged drought was particularly severe in some areas of southern California, where so little moisture fell during the winter of 1960–61 that the normal growth cycle of chaparral was interrupted; brush remained dormant in the spring and showed signs of dying by early summer.

Fire control personnel wrought a near miracle in keeping down the acreage burned; fire danger

was prolonged, widespread, and extreme, and the number of fires far above normal. During June and July nearly twice the usual number of fires occurred in Arizona and New Mexico, and in August the number of fires nationwide was more than double the 5-year average for the period. In one 3-day period firefighters battled nearly 600 lightning fires on the National Forests in Montana, Idaho, Oregon, and Washington.

Most fires were suppressed quickly, but some got away and required extraordinary efforts to bring them under control. In mid-August, 7,000 firefighters were needed to control 7 major fires that burned 60,000 acres in Montana and Idaho. Nearly 500 supervisory personnel were brought in from other Forest Service Regions in one of the largest such movements in the history of the Forest Service. In October and November, seven fires on the National Forests in California burned between 1,000 and 3,000 acres each.

Outside of the West, the fire season was not so severe. Area burned east of the Plains was 39 percent less than in 1960 and 41 percent below the 5-year average. Fires in Alaska were much below average.

### Aerial Firefighting

Aircraft again contributed heavily to the Forest Service's firefighting efforts. During the year, they flew a record 61,942 hours on fire control work. Aircraft use in 1961 was 29 percent greater than in 1960, and nearly double that of 1959. Airplanes and helicopters were used primarily for aerial patrol, reconnaissance on going fires, transportation of men and equipment, and aerial delivery of chemical fire retardants on fires.

Smokejumpers parachuted to 1,221 fires, a 55-percent increase over their previous all-time record, and helijumpers from 19 bases jumped to 213 fires. Air transportation of regular firefighters exceeded by 38 percent any previous year's air movement of personnel. Equipment and supplies transported by air also set a new record of 4,209,000 pounds, in contrast to 2,786,000 pounds in 1960. Air tankers and helicopters dropped 7,572,000 gallons of chemical fire retardants on 1,868 fires in 1961, in comparison with 5,928,000 gallons on 1,050 fires in 1960.

New major air tanker bases were established at Prescott, Winslow, Silver City, Wilcox, and Marana, Ariz.; Challis, Idaho; and Lakeview, Oreg. This made a total of 27 primary air tanker bases in use in the West, with many secondary bases also in operation. Five interregional reinforcement crews were provided aerial transportation to most of the major fires.

### Training

Aggressive and modern training programs play a large part in successful forest fire control operations. Crew bosses, fire bosses, safety officers, pilots, and individual firefighters all benefit from training that increases firefighting effectiveness and insures greater safety. Training has become particularly important in view of rapidly changing techniques, development of specialized equipment, and the increased use of aircraft and chemicals. During 1961, fire control training programs reached many people at all levels.

Early in the year the first national fire generalship school of the Forest Service was held.

A national air operations training workshop developed techniques, qualifications, and training standards to improve safety and efficiency of air operations.

Regional fire chiefs met for the first time in several years to set new procedures and practices to be followed during the next few years.

A special training development project studied training devices used in industry and other government agencies.

Special emphasis was given to a fire overhead qualifications program, requiring specific training and experience for supervisory personnel assigned to fire suppression work.

Advanced fire behavior training continued on the national level, while in the Regions several hundred fire supervisors gained additional on-the-job training and experience in combating major fires.

Training of supervisory fire control personnel was aided by the production of two motion pictures, one on common weather problems and one for crew boss training.

## ENGINEERING

Full development of the National Forests and National Grasslands calls for the wide range of skills provided by Forest Service engineers. These skills are needed to build roads, make maps, survey property lines and corners, and construct dams, buildings, lookout towers, and airfields. In 1961, as in every year, Forest Service engineering accomplishments contributed significantly to the management and use of our National Forest resources.

### Roads and Trails

The transportation system for better protection, management, and use of the National Forests continued to be expanded during the year; as of June 30, 1961, it consisted of approximately 179,210 miles of roads, 106,580 miles of supplemental foot and horse trails, and 488 landing fields for fixed-wing aircraft. This system is maintained in part by the Federal Government, and in part by State and local authorities, private cooperators and permittees, and timber purchasers.

The following tabulation shows how the roads and trails in the system were maintained in fiscal year 1961.

642276—62——4

| | Estimated mileage | |
|---|---|---|
| | Roads | Trails |
| Maintained for traffic or cared for and preserved by the Government | 103,337.4 | 106,096.1 |
| Maintained for traffic by others | 75,875.1 | 480.9 |
| Total | 179,212.5 | 106,577.0 |

In fiscal year 1961 the funds obligated for maintenance, preservation, construction, and reconstruction of forest roads and trails totaled $45,012,152. In addition, Federal timber purchasers built or reconstructed roads with an estimated value of $44,239,096.

Construction and reconstruction work on the National Forest transportation system in fiscal year 1961 was as follows:

| | Units of work completed | |
|---|---|---|
| | By the Government | By Federal timber purchasers |
| Roads (miles) | 694 | 3,525 |
| Trails (miles) | 230 | -- |
| Bridges (number) | 313 | 26 |

The Forest Service has begun a trail system analysis for the purpose of identifying the trails that will be needed permanently following installation of the complete road system. The analysis will determine economic construction standards, taking into account the minimum expense of annual trail maintenance requirements.

Efforts continued toward expanded use of photogrammetric surveys and automated road design calculations in the interest of reducing road engineering expense.

### Buildings

In fiscal year 1961, the Forest Service continued a varied and comprehensive building program. It spent approximately $6,100,000 for construction or purchase of new administrative buildings and for improvement of existing buildings. New construction included 75 dwellings, 48 barracks and cabins, 32 lookouts, and 147 other buildings, such as offices, warehouses, messhalls, and garages. Construction began on four research laboratories included in the fiscal year 1961 program, of which two (Stoneville, Miss., and Marquette, Mich.) have been completed and accepted. Plans have been started on 16 research buildings included in the fiscal year 1962 program, at a total program cost of $5,195,000.

### Equipment

Work continued on a large number of projects for the development of better and safer equipment in all phases of fire control work. Performance and structural loading tests were held to determine the usefulness and safe operating limits of two types of air tankers. Smokejumper equipment improvements included a parachute with slower descent and better maneuverability, a completely redesigned jumping suit and parachute harness, and new training devices. Working models of a new hand-held fireline trencher gave excellent results, and preliminary design was started on a self-propelled trencher. A 5-year program was begun to convert all Forest Service 1½-inch fire hose couplings to a national standard for thread size.

At a meeting in Ogden, Utah, in January 1961, the Forest Service adopted, with amendments, the American Standard Safety Code for Aerial Passenger Tramways, published by the American Standards Association. This code incorporates to a large extent the experience gained by the Forest Service, materials manufacturers, and ski lift operators in the design and operation of facilities on the many winter sports areas on the National Forest. The Forest Service now has an effective guide and a uniform policy on all ski tow design and operation except rope tows. Proper design and operational criteria for rope tows are now being determined.

A study was made of Forest Service passenger car requirements to explore possibilities for substitution of "compact cars" for the standard six-passenger sedans. Results of the study showed that compacts would suffice for trips made by 30 percent of the automobile fleet, but otherwise standard vehicles are more economical because of more ample accommodation for passengers and baggage.

### Water Developments

The Forest Service continues to gain better recognition of the multiple use aspects in the administration of upstream storage areas. Fourteen applications were processed for waterpower developments for Federal Power Commission licenses; plans were investigated and approved for 746 dams to be built by special-use permittees and other users of National Forest lands; and 25 follow-up reports were processed on FPC licensed projects.

### Property Lines and Corners

Field search was made for 15,840 land corners during the year. Evaluation of on-the-ground evidence showed that 9,200 corners could be remonumented without additional cadastral surveys. Evidence was not sufficient for the certification of 6,540 corners; therefore, cadastral surveys will be required before those corners can be remonumented. A cooperative program with the Bureau of Land Management for the resurvey of National Forest lands derived from the public domain has been begun to accurately locate and remonument the missing property corners.

Permanently remonumented were 10,261 corners with standard brass-capped iron pipe or concrete posts. A total of 253 miles of property lines locating lands under the administration of the Forest Service were marked and posted. An additional 5,864 miles of property lines were temporarily marked to a stage where they can be subsequently posted in accordance with standard practice. Spe-

cial training in corner search, evaluation, and property line marking and posting was given to 493 forest officers and technicians in 71 meetings conducted by qualified personnel in the Regions.

### Aerial Photography

The use of aerial photographs continues to increase and now includes recreational area planning and use studies. Contracts were awarded for 45,014 square miles of large scale photography for resource and management studies and 6,782 square miles of small scale photography for mapping and use contracts.

### Surveys and Maps

Forest Service map coverage requirements increased during the fiscal year from 773,214 square miles to 786,655 square miles. Acquisition of Klamath Indian Reservation lands as the nucleus of the Winema National Forest accounted primarily for this expansion of mapping needs. These requirements include in addition to Forest Service-administered lands, intermingled or adjoining private lands.

In fiscal year 1961 planimetric maps were produced for 54,000 square miles of National Forest and adjoining or intermingled lands. This increases reliable planimetric map coverage to 420,195 square miles or approximately 53 percent of the total need.

Estimated Forest Service needs for topographic map coverage is 624,916 square miles. Topographic maps were completed during the year for 814 square miles; and other agencies—the U.S. Geological Survey, primarily—completed topographic maps for 20,964 square miles of National Forest and intermingled or adjacent lands. At the end of the fiscal year topographic maps were available for 43 percent of the required coverage.

### Interpretive and Direction Signs

An estimate of signing needs will be completed in fiscal year 1962. Meanwhile sign design and placement efficiency is being studied in an effort to better acquaint travelers and National Forest visitors with recreation areas and multiple-use objectives.

## LANDS

### The Winema National Forest

The Winema National Forest, an entirely new unit in the National Forest System, was established by proclamation of the President on July 26, 1961, effective July 1, 1961. It comprises 967,000 acres of highly productive multiple use land in southern Oregon, of which 419,000 acres were former Klamath Indian Reservation lands acquired by the United States, and the remainder were formerly portions of the Rogue River, Deschutes, and Fremont National Forests. By the same proclamation the President added 106,000 acres of acquired Klamath Indian Reservation lands to the Fremont National Forest. Headquarters for the new National Forest is in Klamath Falls, Oregon.

By proclamation of April 1, 1961, the Secretary of Agriculture took title in the name of the United States to the 525,000 acres of former Klamath Indian Reservation lands from which the nucleus of the new National Forest was formed. The United States paid the Indian owners $68,717,000 for the lands, which under the enabling law now have the same status as lands acquired by the United States under the Weeks law of March 1, 1911.

### National Forest Changes

The Delta National Forest in Mississippi and the Uwharrie National Forest in North Carolina were established by order of the Secretary of Agriculture pursuant to the Weeks law. These new National Forests are former National Forest purchase units in which forest land purchase and management programs have been carried out by the Forest Service since the 1930's.

In the Central and Lakes States the boundaries of nine National Forests were modified by Executive Order so as to exclude substantial areas of private lands. These areas had originally been included within National Forest boundaries so that they might be purchased under the Weeks law; however, changing land-use patterns indicate that such purchase is no longer necessary or practical.

### National Grasslands Officially Named

By order of the Chief, March 16, 1961, the eighteen National Grasslands were grouped into administrative units and given locally significant names derived from topographic features, Indian tribes, or other historic associations. Typical of the colorful names given these former land utilization projects are: Little Missouri National Grassland in North Dakota, Pawnee and Comanche National Grasslands in Colorado, Thunder Basin National Grassland in Wyoming, and Fort Pierre National Grassland in South Dakota.

### Exchanges and Purchases

During fiscal year 1961, 82 exchange transactions were approved, authorizing the exchange of 345,479 acres of Government land, including 260,000 acres of unreserved public domain in New Mexico, for 206,579 acres of State, county, or private lands within National Forest and National Grassland boundaries. When completed, these exchanges will help to block in the Federal lands for more effective administration.

Eighty-three tracts containing 8,598 acres were approved for purchase under the Weeks law. Seventeen tracts totaling 1,757 acres were approved for purchase pursuant to public acts applying to the Cache National Forest in Utah and the Superior National Forest in Minnesota.

Changes in the areas of lands administered by the Forest Service in fiscal 1961 are as follows:

| | Acres |
|---|---|
| Total area administered by Forest Service (owned by United States) June 30, 1960 | 185,627,958 |
| Increases: | |
| 1. Purchased | [1] 535,475 |
| 2. Conveyed to United States in exchange | 52,349 |
| 3. Donated to United States | 174 |
| 4. Transferred from other Federal agencies | 201 |
| 5. Reserved from public domain | 6,415 |
| 6. Recomputations, adjustments, and miscellaneous | 7,614 |
| Total | 602,228 |
| Reductions: | |
| 1. Conveyed by United States in exchange | 39,920 |
| 2. Grants, Sales, Reconveyances, Mining Patents, Homesteads, etc. | 3,347 |
| 3. Transferred to other Federal agencies | 16,221 |
| 4. Eliminated from National Forests and returned to public domain status | 1,440 |
| 5. Recomputations, adjustments, and miscellaneous | 8,947 |
| Total | 69,875 |
| Total area administered by Forest Service (owned by United States) June 30, 1961 | 186,160,311 |

[1] Includes 525,585 acres of Klamath Indian Lands.

## Access Procurement

For fiscal year 1961, the Forest Service obtained 504 raw-land easements, roads, or interests in roads for 440 miles of roads. During the period from July 1 to December 1961, it acquired an additional 256 raw-land easements, roads, or interests in roads for 213 miles of roads.

Consummated were 14 cost-sharing agreements covering 186 miles of roads and providing access to about 9.5 billion board feet of National Forest timber. These cost-sharing agreements provide for cooperation between the Forest Service and private landowners where mutual access problems can be resolved through cooperative arrangements.

# Cooperation—State and Private Forestry

State and private forest owners continued to reap the benefits afforded by the Federal-State cooperative programs authorized by Congress. The effectiveness of the forest fire prevention program was evidenced in the annual statistics that showed less than 100,000 man-caused fires for the fifth year in succession. Kansas became the 49th State to cooperate with the Federal Government in providing organized fire protection for State and private lands. Federal technical assistance was offered to an increasing number of State Foresters and private forest owners and managers through the General Forestry Assistance program. Consolidation of all control activities under one unit and increased funds bolstered Forest Service efforts to combat forest insects and diseases on cooperating Federal and non-Federal lands. Flood prevention and rural development programs continued at an accelerated pace. Forest and shelterbelt plantings remained at high levels though the number of trees planted fell below the 2 billion mark scored in each of the previous two years.

## TREE PLANTING

Forest and shelterbelt planting fell from the record years of 1959 and 1960 to 1,796,206 acres (1.8 billion trees), a decrease of 16 percent. This decrease was due to a substantial reduction in planting on Soil Bank Conservation Reserve land.

Of the nationwide planting, 83 percent was on privately owned land, 46 percent of which belonged to forest or other industrial organizations. All classes of ownership registered a substantial increase in forest plantings, except the noncorporate private-ownership group (small woodland owners), which showed a decline of 35.4 percent from last year to a total of 432,730 acres.

Windbarrier planting took place on 34,171 acres, a decrease of 1,195 acres from the 1960 figure. As in 1960, more than one-third of this planting was done in North Dakota, where single-row planting continues to be popular.

Federal land planting increased 18 percent to 204,702 acres, of which National Forest planting showed a 20-percent increase to 160,960 acres, and Department of the Interior plantings showed a 27-percent increase to 28,856 acres. Planting on other Federal lands totaled 14,185 acres, a decrease of 16 percent.

State and other non-Federal public land planting rose to 102,256 acres, an increase of 12 percent above the 1960 acreage.

### Southern States Still Lead in Planting

The 11 Southern Region States planted 1,164,224 acres, or nearly 65 percent of the national total. Eight of these States planted over 50,000 acres each. Only two other States in the country exceeded this figure: Oregon with 145,104 acres planted, and Washington with 64,776 acres.

In the last 5 years, total acreage planted in the Southern Region has risen from 4,328,484 acres to 10,445,807 acres, the rise representing an increase in relation to the national total from 37 percent in 1956 to 47 percent in 1961.

### Direct-Seeding Increases Continue

Forest land regeneration chalked up further gains in 1961 when 181,404 acres were seeded directly with tree seeds. This compared with 164,523 direct-seeded acres in 1960. The success of this method is attributed to effective bird- and rodent-repelling chemicals applied to the seed.

### Seedlings No Longer in Short Supply

For the second successive year there was an adequate supply of seedlings. More States reported an oversupply in 1961 than in 1960. A total of 1,537,558,000 trees were shipped to landowners and planters in 1961 compared with 1,918,746,000 in 1960.

Distribution from Federal nurseries fell 27 percent from 1960; State nurseries showed a 26-percent reduction. Other public nursery distribution was slightly lower than in 1960. Industrial landowner nurseries posted a 14-percent increase and 89 commercial nurseries reported an 11-percent decrease.

### Clarke-McNary Tree Planting Stock

Distribution of trees acquired and produced under Section 4 of the Clarke-McNary Act declined again—774,159,000 plants compared with 844,599,000 in 1960 and 945,464,000 in 1959. Forty-eight States and Puerto Rico cooperated in this program. Direct Federal financial assistance at $194,488 was slightly more than in 1960. The State contribution was $2,695,898—the largest it ever had been, exceeding the 1960 amount which was the highest previous figure. Landowner or purchaser contribution amounted to $4,244,621, slightly more than in 1960.

To encourage tree planting, the price of planting stock is kept as low as State and Federal financing will permit. The average selling price in fiscal

year 1961 was $5.83 per thousand. This is an increase of 59 cents per thousand over the 1960 price.

### Soil Bank Conservation Reserve Accomplishments

Except for a few thousand acres in 3 or 4 States, initial planting of the approximately 2,150,000 acres of land under Conservation Reserve contract designated for tree planting was completed in 1961.

Conservation Reserve funds were used to purchase or produce and distribute 208,547,000 trees during the year. State Foresters provided 630 man-months of technical assistance to landowners and county committees in the planting of Conservation Reserve land. Approximately 43 percent of this service was financed by Conservation Reserve funds allotted to the States.

## COOPERATIVE FOREST FIRE CONTROL

Kansas became the 49th State to provide organized protection to State and private lands.

Cooperative forest fire control is authorized by the Clarke-McNary Act of 1924. The Federal Government, through the Forest Service, makes Federal funds available to States to assist in providing adequate forest fire protection. With the increase in Federal appropriations during the year, accomplishments were evident in the greater area under protection and the reduction in the number of fires and area burned.

To get the program on a sounder statistical base, procedures were prepared and distributed to the States with which the Federal Government is cooperating, relating to field training in the collection, compilation, and computation of forest fire statistics. Such training has been accomplished in many States.

An article on interstate forest fire protection compacts was prepared by the Division of Cooperative Forest Fire Control and published in the quarterly of the National Fire Protection Association.

All the States in the program continue to take advantage of their privilege to acquire forest firefighting equipment from Federal excess property lists. By this means, the States are able to obtain specialized equipment that can be adapted to forest firefighting in quantities which they otherwise could not afford.

As a member of the National Rural Fire Defense Committee, the Forest Service has participated in defense orientation schools, assignments to the classified site, and Operation Alert and the damage assessment training programs; and assisted in the preparation of handbooks, plans, and other materials pertaining to fire control.

## COOPERATIVE FOREST FIRE PREVENTION

The Smokey Bear program (CFFP) demonstrated its work in 1961 by helping to keep man-caused forest fires well below 100,000 for the fifth consecutive year. Forest fire prevention efforts paid off particularly well on the National Forests; in spite of extreme drought in the West and constantly increasing public use, the number of man-caused fires was kept down near the record low.

The Cooperative Forest Fire Prevention Program is conducted jointly by the Association of State Foresters and by the Forest Service, under sponsorship of The Advertising Council, Inc. Smokey's Headquarters are located in the Division of Information and Education, Forest Service, Washington, D.C.

### Highlights and Awards

Through the cooperation of the Native Sons and Daughters of the Golden West, a Smokey Bear forest fire prevention float was again entered in the Pasadena Tournament of Roses parade.

The 1961 Presidents' Award of the Children of the American Revolution was presented to the Forest Service and the Association of State Foresters in May for "outstanding contribution to American youth . . . for sponsorship of Smokey the Bear."

In October, the Golden Smokey award was presented by the CFFP to the National Association of Transit Advertising, Inc., for outstanding public service in forest fire prevention. More than 1½ million Smokey Bear bus and car cards have been displayed free of charge in transit systems all over America during the past 20 years.

### Southern CFFP Emphasis

The Southern Cooperative Forest Fire Prevention Program, emphasizing the loss to the South from incendiary and debris-burning fires, increased distribution of materials produced by Liller, Neal, Battle, and Lindsey, volunteer advertising agency. One television announcement, "Mr. Burnit's Eyes," won first place in the television category at the eleventh annual exhibition of the Art Directors Club of Atlanta. Though progress in reducing incendiarism and careless debris burning is not yet evident, other man-caused fires are being reduced in the South each year.

## RURAL AREAS DEVELOPMENT

The Department of Agriculture's long-range program to help assure economic stability and prosperity to rural people must necessarily include the contributions of forest land. Many low-income rural areas are over 50 percent forested. These woodlands have contributed far less than their potential to the economy of the areas.

Establishing a firm foundation for permanent prosperity in rural areas, contributing to a more rapid rate of economic growth, and insuring that human and natural resources in rural areas are used at maximum feasible efficiency—all require improved management and utilization of the woodland sections of such areas. Public Law 87–27, the Area Redevelopment Act, provides that

available facilities of all agencies of the Federal Government shall be used to the fullest extent in carrying out the provisions of the Act.

The Forest Service works with other agencies at national, State, and local levels to increase the contribution of forest lands and forest industries to the economy of an area. The Forest Service has stepped up its activities in the following ways to assist in improving economic conditions in low-income areas:

1. Gearing National Forest timber sales in many instances to small operators employing local labor.
2. Employing more local workers through development and improvement work on National Forests.
3. Conducting economic and forest products research, marketing surveys, and price reporting activities.
4. Providing technical forestry assistance to State and local Rural Areas Development Committees to assist them in preparing economic development plans.
5. Providing technical assistance to wood-using industries in production techniques, plant layout, modernization, and expansion, thereby increasing employment opportunities.
6. Assisting landowners to manage their woodlands for maximum production of timber and other products and services under the multiple use concept through cooperation with State forestry departments.

## FOREST MANAGEMENT

The Forest Service cooperates with other agencies of the Department, State forestry organizations, and private forest owners in various forest management programs. As forestry specialists for the Department, the Service works closely in activities pertaining to forestry or forest lands with the Soil Conservation Service, with the Agricultural Stabilization and Conservation Service in the agricultural conservation program and the naval stores conservation program, and in various activities with the Federal Extension Service.

The Forest Service also cooperates with the Business and Defense Services Administration in certain defense activities involving forests and forest products, and with other Federal agencies concerned with administration of forested lands, such as the Atomic Energy Commission and the military organizations.

### Technical Forestry Assistance

The Forest Service administers the Cooperative Forest Management program with State forestry organizations under authority of Public Law 81–729. More than 104,000 requests for technical forestry assistance were received in 1961 from woodland owners and operators under this cooperative program. Assistance was provided to owners of over 4.5 million acres of woodland. Although the market for timber was weak in 1961, owners received over $13.5 million for forest products harvested under the assistance of this program. The program has been growing steadily in the past few years. Service foresters employed by States increased from 531 in 1960 to 593 in 1961. Public funds expended increased from $4 million to $4.5 million in the same period.

### General Forestry Assistance Program

Under the General Forestry Assistance program, the Forest Service fulfills its responsibility for Federal leadership in forestry on non-Federal lands by providing specialized technical assistance to State Foresters, and to large private forest owners and managers who control more than 6.5 million acres of forests. In 1961, it provided general forestry assistance to more than 300 owners, processors, and private foresters. Other results of this program include publication of numerous articles on forest management and processing in bulletins, magazines, and trade journals, and active participation of its supporters in 76 professional meetings.

## INSECT AND DISEASE CONTROL

With some reinforcement through consolidation of all control activities under one unit and increased funds, the Forest Service continued the uphill fight against destructive forest insects and diseases. This was done by making surveys to detect and evaluate outbreaks of these damaging agents, by suppressing outbreaks where necessary and feasible on National Forests, by sharing the cost of control projects on non-Federal land, and by furnishing technical assistance to other Federal agency control projects.

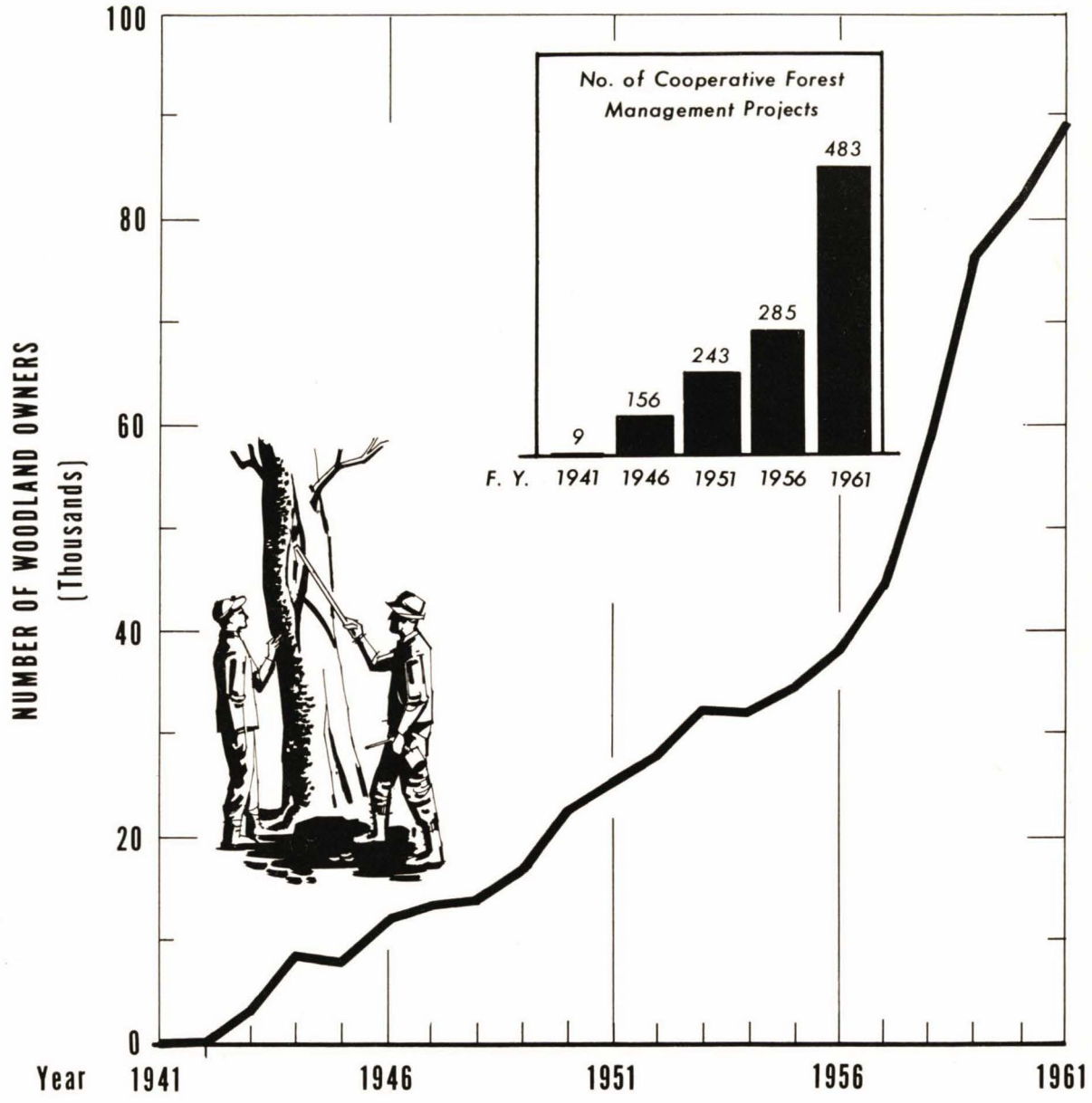
### Controlling Destructive Insects

During the year, 185 control projects were conducted in 35 States to suppress outbreaks of destructive forest insects. Projects were carried out on 80 National Forests and on 16 areas of State and private forest lands.

Suppression activities were directed against ten species of bark beetles, six defoliators, and seven other insects, such as weevils, spittlebugs, scales, shoot moths, and aphids. As has been true during the past 3 years, the largest and costliest projects were against bark beetles, particularly mountain pine and Engelmann spruce beetles. Over $2,393,000 was spent to treat over 1,219,000 infested trees, stumps, and cull material for bark beetle control on National Forests and intermingled and adjoining non-Federal lands. The largest projects were in Utah and Wyoming, where $697,000 and $460,000 were spent on continuing projects to suppress outbreaks of mountain pine and Engelmann spruce beetles, respectively. In addition to

# Woodland Owners

## Assisted Through Cooperative Forest Management




the trees treated, over 23 million feet of infested timber were removed by salvage logging operations.

In contrast to previous years, only limited aerial spraying was employed against defoliating insects. The largest aerial operations were against the spruce budworm on cooperative projects on non-Federal land in Maine and Minnesota, covering 65,665 acres, and against the elm spanworm on 7,885 acres of Federal land in Georgia and North Carolina.

With the discovery of the European pine shoot moth in the State of Washington, the Forest Service cooperated with the States of Oregon and

Washington and the Agricultural Research Service in detailed surveys to locate all infested trees. In 1961 nearly 587,000 trees were examined, over 800 infested ornamental trees were removed and burned, and a satisfactory method of fumigating shoot moth-infested trees was developed. State quarantines against the movement of infested trees have been invoked by California, Hawaii, Idaho, Montana, Oregon, Utah, and Washington. Federal quarantines against the movement of infested material into the Northwest from Canada have also been set up in an effort to protect native pine stands.

### White Pine Blister Rust

The fight against blister rust was pressed forward on all important public and private white pine-growing lands in the Nation. In this fight the earlier promise shown by antibiotic fungicides for controlling the disease in western white pine stands is being fulfilled. Two-thirds of the 1961 control work in Oregon, Washington, Idaho, and Montana was done with these blister rust-killing drugs. Outstandingly significant for future work is the success achieved by applying them with aircraft. Also significant is the distinct possibility of immunizing planting stock against blister rust for a useful period of time by treating western white pine nursery beds with antibiotics. Development of these methods of control makes it possible to bring additional thousands of acres of western white pine into productivity—acres that previously had to be withheld from the control program because of exceptionally high rust hazards or because values at stake did not warrant control costs by the ribes eradication method.

In the sugar pine stands of California and southern Oregon and in the eastern white pine stands in the North Central, Northeastern, and Southeastern States, successful antibiotic control has not, as yet, been achieved. However, encouraging test results on diseased sugar pine give some promise of a breakthrough for that species soon, and a program was organized and started for a thorough evaluation of antibiotic control in the eastern white pine region. Ribes eradication is, therefore, still the principal means of preventing blister rust damage to sugar pine and eastern white pine.

A total of 6.5 million ribes were removed from 199,000 acres. Also, 2.8 million acres were systematically inspected to determine the status, need, and feasibility of control. Seventy-two percent of this control effort was on State and private land with 22 States cooperating; the remaining 28 percent was on Federal lands in 29 National Forests, 12 National Parks, two Indian Reservations, and two Bureau of Land Management Districts. Antibiotic control in the western white pine region resulted in the treatment of 12.5 million trees on 67,459 acres, 19 percent of which was on State and private land in Idaho and 81 percent on Federal land, principally on National Forests in Idaho, Montana, Oregon, and Washington.

### Oak Wilt Control

The Forest Service continued participation in Federal-State share-the-cost oak wilt control projects on State and private land in Arkansas, Kentucky, North Carolina, Pennsylvania, Virginia, and West Virginia. In these States, 42 million acres of State and private land were aerially surveyed to detect oak wilt infected trees. A total of 4,056 were located and treated. In these same States, 3.6 million acres of National Forest land were surveyed from aircraft. These surveys located 108 infected trees, all of which were treated to prevent further spread of the disease.

### Dwarfmistletoe Control

Dwarfmistletoe control is largely attained through timber cutting and improvement practices. To facilitate control by these practices, 34,870 acres of National Forest lands were surveyed and mapped. Also, a pilot control project was continued in Oregon to determine cost-benefit ratios and feasibility of dwarfmistletoe control in young ponderosa pine stands. On this project, 415 acres were treated at a cost of $30,889.

## FLOOD PREVENTION

### Flood Prevention Projects

The Forest Service continued work on seven flood prevention projects authorized under the Flood Control Act of 1944. During fiscal year 1961, 48 million trees were planted on 52,584 acres of eroding and flood-producing land. Eighty-five percent of these trees were planted on the Little Tallahatchie and Yazoo River projects in Mississippi through the combined efforts of the Forest Service, Soil Conservation Service, Agricultural Stabilization and Conservation Service, Soil Conservation Districts, and local landowners.

On privately owned forest land, technical forestry assistance aimed at the correction of undesirable watershed conditions was given to 5,567 landowners and operators. Improved forest management was applied to an additional 46,184 acres, and 14 miles of sediment-producing logging roads were stabilized.

The strengthening of fire prevention and control on 90,000 acres of National Forest and privately owned land was continued by constructing 17 miles of fire control roads and four buildings for the housing of fire crews and equipment on critical watersheds. Twenty-two debris catchment basins were constructed on the Los Angeles River Project in California to stabilize stream channels and adjacent mountain slopes and to reduce flood and sediment damages in downstream urbanized areas. In particularly rough sections of the Los Angeles River Project, the Forest Service for the first time used helicopters to transport prefabricated channel stabilization structures; use of this aerial transportation reduced the need for access road construction and consequently reduced attendant soil

disturbance and debris movement. On the Potomac River Project in Virginia, 26 channel control structures consisting of bank stabilizing walls, groins, and weirs were installed on the National Forest portion of the North River.

### Pilot Projects

The Watershed Demonstration or Pilot program on 58 small watersheds authorized in 1954 is almost completed. All the forestry measures planned for National Forests and most of those planned for non-Federal forest lands have been installed.

### Public Law 566 Program

The Forest Service, cooperating with the Soil Conservation Service and working through State Foresters, helps local organizations plan and carry out forestry phases of Watershed Protection and Flood Prevention programs under Public Law 566 (83d Congress) as amended.

During fiscal year 1961, the Forest Service worked with State Foresters, the Soil Conservation Service, and local sponsors in planning Watershed Protection and Flood Prevention improvements for 347 small watersheds. Work plans were approved and installations authorized on 48 new projects; 21 of these include accelerated programs for improvement of forest lands. During the year forestry measures were installed on 132 projects.

Seven and one-tenth million trees were planted on 11,900 acres of privately owned land. Technical forestry assistance for watershed improvement was given to 2,241 landowners. Protection from forest fire was extended or strengthened on 938,000 acres. Other watershed improvements included hydrologic stand improvement and protection from grazing damage on 41,100 acres.

On National Forest lands installed improvements include revegetation on 260 acres of depleted watershed land by grass seeding and tree planting; special purpose terraces and contour furrowing on 1,145 acres of critical flood and sediment source areas; stabilization of 29 miles of eroding gullies; and 8 miles of roadside erosion control.

### Emergency Flood Prevention

Emergency watershed treatment measures were applied on 10 burned-over areas within the National Forests in southern California during the year. This work was done to minimize downstream hazards to life and property. About 40,185 acres were seeded to quick-growing grass and mustard. Fills and roadbanks on 4.5 miles of Forest Service roads were treated to prevent accelerated movement of sediment and debris into stream channels and downstream developments.

### River Basin Surveys

The Forest Service participated in cooperative studies of water and related land resources in 12 river basins. These investigations are conducted jointly by the Soil Conservation Service, Forest Service, and Economic Research Service working with the concerned State agencies, and for two special studies with the U.S. Study Commissions for the Southeast and the Texas River Basins.

A report concerning forest stands, forest industries, projections of forest growth, and future supplies of and needs for forest land resources in the Southeast River Basins area was completed by the Forest Service and submitted to the U.S. Study Commission, Southeast River Basins, thus completing contractual arrangements with that agency.

Other cooperative assistance provided to both U.S. Study Commissions included completion of agricultural program information and projections which were made jointly by the Forest Service and other USDA agencies. Members of the staffs of both Commissions were given technical information and advice concerning forest land resources and forest-based industry. Draft copies of portions of the proposed Study Commission's reports pertaining to forest land and forest products were reviewed.

River basin studies of water and related land resources made cooperatively by the Soil Conservation Service, Forest Service, Economic Research Service, and the States concerned were continued on the Tombigbee River in Alabama and Mississippi, Bayou Bartholomew in Arkansas and Louisiana, Gunnison River in Colorado, Sevier River in Utah, Humboldt River in Nevada, and the John Day and Upper North Coast Basins in Oregon. Field investigations and survey reports were completed during the year for the Upper Willamette, North Coast and Deschutes River Basins, the Little Humboldt Sub-Basin, and the Bayou Bartholomew.

The USDA reappraisal of the agricultural impacts of projects authorized by the Upper Colorado River Storage Project Act was concluded at the end of fiscal year 1961 with the exception of two unfinished surveys scheduled for completion during fiscal year 1962. During the year, the Forest Service reported upon the forestry impacts of three participating projects.

River basin survey activities by the Forest Service in the Potomac River Basin included completion of the forestry phases of the USDA survey report, and review of the report material prepared by the Corps of Engineers.

Forest Service membership was continued on interagency river basin technical subcommittees for hydrology, sedimentation, phreatophyte control, and recreation.

# Planning and Legislation

## PROGRAM PLANNING AND SPECIAL PROJECTS

### USDA Land and Water Resource Policy

In August 1961 the Secretary of Agriculture established a committee to guide land and water policy within the Department. Its first task was to review the present and prospective land, forest, and water resource situation, analyze its implications for Department policies, and give program recommendations. The Forest Service, together with other agencies concerned participated in this task and assisted in the preparation of the preliminary report, "A Land and Water Resource Policy for the United States Department of Agriculture."

The report emphasizes the fact that in the years ahead the Nation's basic resource problem will be competition for land among the various resource uses. The report outlines land-use adjustments likely to be needed over the next 20 years to meet requirements for land and water resources. Among the major land-use adjustments needed will be a decrease of about 50 million acres in croplands, a 20-million-acre increase in pasture and rangeland, little or no change in forest land, and an increase of some 30 million acres in various special purpose and miscellaneous uses, including urban areas, designated recreation areas, roads, reservoirs, power lines, and airfields.

The report suggests some possible means of encouraging conversion of croplands to other uses, developing recreational opportunities, and improving conservation and management of land, forests, and waters. Suggested possibilities include planting excess cropland to trees, restoring depleted timber inventories and improving management on small private forest ownerships, and the proposed programs for forestry research and the development of the National Forests.

### Forest Service Data Assembly

The Forest Service has begun a full-scale study of its needs, methods of collection, and assignment of responsibility for data assembly. The study's main purpose is to determine the adequacy of the data for control of operations and long-range planning and of the methods by which data are collected and processed. The study will consider proposals for improving collection standards and methods, achieving better coordination, clarifying responsibilities, and minimizing duplication. Records and reports currently in use will be analyzed and improvements recommended as needed.

Other program planning and special project activities during the year included work on the Report of the National Forest Recreation Survey and a joint Forest Service and Bureau of Land Management public rangeland appraisal study. Each of these activities is discussed under the appropriate National Forest resource heading (pages 15 and 17).

## LEGISLATIVE REPORTING

### Legislation Enacted

The act to authorize appropriation of funds for the purchase fo certain lands within the Superior National Forest, Minn., was one of the major Forest Service legislative proposals enacted during the year. This act (P.L. 87–351) authorized appropriation of $2,000,000 to acquire the remaining private property within the Boundary Waters Canoe Area and removed the previous restriction on condemnation of such property. This will facilitate consolidation of Federal ownership in the area and further provide for the preservation, protection, and restoration of its wilderness conditions and unique qualities.

Other legislation affecting Forest Service activities enacted during the first session of the 87th Congress included a land exchange between the Dixie National Forest and the Cedar Breaks National Monument (P.L. 87–81); the transfer of Lassen National Forest land to Lassen Volcanic National Park (P.L. 87–129); and authorizations for various conveyances, transfers, or exchanges of land with local governing units.

### Legislative Review

The Forest Service followed on a day-to-day basis about 400 bills which would affect its activities. This did not include many bills of a general nature which would have Government-wide application. It prepared or reviewed legislative reports on 257 bills and proposals and provided a number of Congressmen with legislative drafting service. Testimony was given before congressional committees on 11 bills, exclusive of appropriation bills. Twenty-one bills of direct interest to the Forest Service were enacted during the year.

# Administration

A strong, efficient Forest Service depends heavily on the strength of its administration—on the smooth operation of servicewide functions such as fiscal control, administrative management, dissemination of information, and personnel management. Forest Service administration provides the solid foundation for more effective programs in research and for better management and use of the Nation's forests.

## ADMINISTRATIVE MANAGEMENT

### National Forest Business Management Workload Analysis

A study on revising the formula and factors for computing the National Forest business management workload was completed. This analysis will help bring the business management workload measurement system in line with current job requirements, responsibilities, and extensive use of automated data processing.

### Organization Study

Steady progress was made in implementing the recommendations of the comprehensive study of Forest Service organization that McKinsey and Company, Inc., completed last year under a contract. As the year ended, about half the work to carry out the recommendations had been done.

### Fleet Equipment Statistics

A new automatic data processing system has been evolved and put into operation to provide fleet managers with current and effective operating and fiscal data. The system was developed by the Divisions of Administrative Management, Budget and Finance, and Engineering, as a result of a study to determine accounting and statistical needs for effective fleet management. Complete procedural instructions for uniform application have been worked out along with essential records and reports needed for internal and external transactions.

## ADMINISTRATIVE SERVICES

A system of coordinated contracting was worked out for the design and construction of research buildings.

A weeklong meeting provided specialized training for regional administrative services officers and station managers. The program covered steps needed to keep administrative services operations in pace with the demands of an expanding resource and research program and suggested means for improving the efficiency of such service operations.

## DEFENSE ACTIVITIES

The Forest Service, under defense assignments made by the Secretary, is responsible for (a) prevention and control of fires in rural areas caused by effects of enemy attack (in cooperation with State governments and other Federal agencies), and determining attack damage to National Forests and other forested areas; (b) emergency protection, management, and utilization of National Forest timber, range, water, and related resources; (c) emergency production and utilization of timber and forest products (in cooperation with Business and Defense Services of the Department of Commerce); (d) cooperative activities concerning equipment, manpower, fuels, chemicals, and other requisites needed to carry out assigned defense tasks; (e) monitoring for fallout at federally designated fixed stations and on National Forest lands; (f) research in support of defense planning and emergency operations.

Several hundred Forest Service employees served on county and State USDA Defense Boards throughout the Nation.

The Forest Service aided rural fire defense planning by providing tables that showed for each month the estimated burnout by bomb size for each fuel zone area in the United States. Instructions, tables, and regional fuel zone maps were supplied to each State Rural Fire Defense group for use in wild-land fire damage assessment. The method was tested in determining the damage during Operation Alert 1961, in which the Forest Service participated.

Five instructors were provided for the first national staff and command course for rural and urban fire control personnel that was held in October at Battle Creek, Mich. The training subcommittee of the National Fire Defense Advisory Committee planned the course under the sponsorship of the Office of Civil Defense, Department of Defense. The Forest Service serves as chairman for the National Rural Fire Defense Committee. The committee also developed a test for the national operational fire defense plan, which will coordinate firefighting in attack emergencies.

Forest Service personnel also cooperated with the Department and other Federal agencies in the Chemical, Biological, and Radiological Defense Orientation School at Battle Creek; in cadre assignment at the USDA relocation site, and in the USDA damage assessment training programs.

The Forest Service accomplished the following in the field of fallout monitoring: (1) It brought 310 fixed radiological monitoring stations into operational status. (2) It began a program to

make operational field units capable of radiological monitoring—these units would have continuing responsibility during a nuclear emergency. (3) It distributed approximately 50 percent of the equipment that would be needed by these field forces. (4) It equipped all radiological monitoring stations with gas masks as a precaution against chemical and biological warfare.

More help in fire defense planning is now available through two new fire research publications. The first, "Effects of Mass Fires on Personnel in Shelters," used data from several test fires in California and gives new emphasis to the guarding of shelter air supplies from contamination by nearby fires. It has already affected the plans and specifications for fallout shelters. The Forest Service's Pacific Southwest Forest Experiment Station carried out the research for the publication. The second new booklet, "A Study To Analyze and Improve Procedures for Fire Damage Assessment Following Nuclear Attack," was prepared for the Forest Service by the Broadview Research Corporation.

## PUBLIC INFORMATION

### Multiple Use Information

As intensified multiple use management provides greater benefits and uses from the National Forests and Grasslands, an information program is underway to acquaint National Forest users and the general public with these uses and benefits—and with the basic principles of multiple use. Information about multiple use and sustained yield reaches the public in many ways: Pamphlets, folders, posters, exhibits, motion pictures, recreation maps of the National Forests, and interpretive signs.

A key part of the multiple use information program will be a series of booklets on the benefits and uses of the National Forests. Each booklet will be devoted primarily to one of the resources (water, wildlife) or to a public benefit (wilderness, winter sports), but all will explain the idea of multiple use: how the particular use or benefit is part of a much larger whole—the overall program for the management of the National Forests. Currently, booklets have been released on wilderness and camping, and booklets on water and forest trees are in preparation.

A new symbol (see below, left) will appear on these informational materials; this is the symbol for the National Forests, created this year to convey at a glance the concept of multiple use. The basic element is a "multiple use tree," a continuous line that traces the outline of a tree with five interlocking loops, corresponding to branches, which represent the five basic resources—water, wood, forage, recreation, and wildlife. Encircling the symbolic tree are the words, "National Forests, Lands of Many Uses." This symbol will be used on informational materials in conjunction with the multiple use Forest Service shield; it does not replace the shield, which will continue to be seen at entrances and exits to the National Forests and at other places.

### Visitor Information Service

In 1961, the Forest Service formally established a Visitor Information Service, which will coordinate and develop on-the-ground information services for the rapidly growing crowds of visitors on all the National Forests. Although interpretive services have been provided on a limited scale in some outstanding areas for many years, the particularly heavy increase in use of the National Forests within the last 15 years has pointed up the need for visitor services on all National Forests. The Visitor Information Service facilities will range from simple nature trails and scenic overlooks to visitor centers that house exhibits and more elaborate interpretive facilities.

As the National Forest visitor load continues to grow and the expanding population consumes even more of the timber, range, and water resources, it becomes increasingly important for visitors to know of the benefits of forest lands and of the need to protect and use them wisely. Clearly the best place to tell the public about conservation and forest management is on the ground in the National Forests, where such conservation is practiced. Interpretive services are of public value on many areas of National Forests which attract large numbers of visitors because of unique geology, plant life, or other outstanding features.

Without waiting for facilities to be built, the new Visitor Information unit went to work last summer with what was available—trained foresters and plenty of visitors at popular recreation areas. In Montana, interpreters explained what happened during the Madison River Canyon earthquake of 1959 to more than 350,000 visitors; at the Ocala National Forest in Florida visitors learned about the tropical vegetation in the Juniper Springs and Alexander Springs recreation areas.

The first visitor center is now under construction in Alaska and will be ready for the 1962 summer season. Located in the Tongass National Forest, it overlooks one of the world's spectacular sights, the Mendenhall Glacier. Two miles wide with an ice front standing 100 to 200 feet high, Mendenhall is the largest glacier in the world accessible by road.

### Public Requests for Information

The volume of requests for information from the public continued to grow almost as fast as the National Forest visitor rate. The Washington office alone answered more than 100,000 written requests for pamphlets and bulletins on forestry and the National Forests. In addition, Smokey Bear headquarters continues to receive more than 500,000 letters annually. Requests for information were likewise increasing at all field offices.

To keep up with this demand, 4 new general-interest motion pictures, 12 new popular publications, and 42 new pamphlets and bulletins on technical forestry subjects were prepared and released by the Washington office.

## PERSONNEL

The Forest Service, which has devoted careful attention to the training and development of its employees for 55 years, adopted a new approach to this important work in 1961 in a program of "training guides."

The program will more effectively integrate training and development with overall personnel management. The basic objective is to provide the training needed by individuals not only to attain proficiency on their current jobs, but also to prepare them for career advancement. Methods of training listed in order of significance to the individual are self-development, coaching on the job, and formal instruction. Although the individual's learning depends first on his self-application, coaching on the job and formal instruction stimulate and guide self-accomplishment.

Under the program, joint endeavor and cooperation by the work supervisor and the individual are fundamental. Working together, they can best identify and plan the training needed. They are the ones who must accept responsibilities for actual training accomplishments. The work supervisor is in the best position to guide on-the-job training, stimulate self-development, and identify needs for formal group inservice or outservice training. This formal group instruction augments, supplements, and stimulates efforts by the individual and his supervisor toward two ends: stronger knowledge and skills, and aggressive performance in self-training both on and off the job.

The "training guides" system is adapted for use as part of other key personnel management activities such as daily job supervision, career planning, qualification evaluation, position classification, performance rating, and placement. Through study and evaluation of individual needs and potentials, then balancing them with Forest Service requirements, a systematic training program for each employee is evolved. Expected results are geared to grade levels of responsibility within career specialities. The program divides emphasis between training in management and training in technical or functional fields.

## BUDGET AND FINANCE

### Receipts and Expenditures

Receipts for National Forest resources amounted to $104,421,847 in fiscal year 1961. Sources of the receipts were as follows:

| | |
|---|---|
| Timber | $98,424,572 |
| Grazing | 3,268,957 |
| Other | 2,728,318 |
| Total | $104,421,847 |

Included in these figures is $4,069,428 received from National Forest revested Oregon and California Railroad grant lands.

Additional resource revenue included $1,677,936 from National Grasslands and land utilization areas (title III of the Farm Tenant Act). Other sums received included: $706,950 contributed by cooperators and timber purchasers for cooperative work on National Forest programs; $14,746,816 set aside for timber sale area improvements; $6,762,082 set aside for brush disposal; $1,300,878 from miscellaneous receipts; and $5,276 for restoration of forest lands and improvements.

Receipts from all sources, therefore, totaled $129,621,785. In addition, timber purchasers built roads and received allowances on selling prices of timber of an estimated value of $44,239,096. Operating expenses for National Forest programs, National Grasslands, and land utilization projects totaled $137,231,182. Depreciation on roads, trails, and other improvements amounted to an estimated $31,303,000. For the fiscal year, receipts and other income exceeded operating expenditures and other charges by $5,326,699.

Expenditures for other Forest Service activities included $17,647,938 for cooperative State and private forestry programs, and $19,620,613 on forestry research. Both of these figures include expenditures from cooperator contributions, which amounted to $1,957,405 for cooperative State and private forestry programs and $855,191 for forestry research. In addition, the Forest Service received $22,303 for the Smokey Bear forest fire prevention program.

Under the act of May 23, 1908, as amended, the Forest Service pays 25 percent of the National Forest net receipts to States for schools and roads within counties having National Forest land. In fiscal year 1961, based on fiscal 1960, this payment

was $35,408,615. Under the act of June 20, 1910, Arizona and New Mexico school funds received $139,726. Under the act of June 22, 1948, the State of Minnesota received $123,275. Counties received $391,987 from calendar year 1960 receipts of National Grasslands and land utilization areas under the act of July 22, 1937.

By law, the Forest Service retains 10 percent of receipts from National Forest resources, except receipts from revested Oregon and California lands, for expenditure on roads and trails within the National Forests. This amonuted to $14,165,-522 in fiscal year 1961, based on 10 percent of fiscal 1960 receipts.

## INTERNAL AUDIT

The Internal Audit staff completed audits of five Regions, two Experiment Stations, 46 forests, and one repair shop. Five special reviews were also made during the year. An index system was installed in all Internal Audit offices to catalogue the audit findings.

# Statistical Tables

TABLE 1.—*National Forest and other lands administered by the Forest Service, as of June 30, 1961*

| State and Commonwealth | National Forest | National Grassland | Land utilization and other | Total |
|---|---|---|---|---|
| | *Acres* | *Acres* | *Acres* | *Acres* |
| Alabama | 631, 112 | | 661 | 631, 773 |
| Alaska | 20, 741, 994 | | | 20, 741, 994 |
| Arizona | 11, 343, 974 | | 52, 604 | 11, 396, 578 |
| Arkansas | 2, 405, 564 | | 1, 686 | 2, 407, 250 |
| California | 19, 938, 521 | | 23, 933 | 19, 962, 454 |
| Colorado | 13, 710, 311 | 626, 635 | 9, 318 | 14, 346, 264 |
| Florida | 1, 074, 972 | | | 1, 074, 972 |
| Georgia | 777, 159 | | 9, 328 | 786, 487 |
| Idaho | 20, 300, 777 | 47, 599 | 2 | 20, 348, 378 |
| Illinois | 211, 021 | | | 211, 021 |
| Indiana | 119, 652 | | 3, 180 | 122, 832 |
| Iowa | 4, 649 | | 547 | 5, 196 |
| Kansas | | 107, 114 | | 107, 114 |
| Kentucky | 459, 777 | | | 459, 777 |
| Louisiana | 591, 409 | | | 591, 409 |
| Maine | 45, 862 | | 4, 159 | 50, 021 |
| Massachusetts | | | 1, 651 | 1, 651 |
| Michigan | 2, 553, 703 | | 7, 310 | 2, 561, 013 |
| Minnesota | 2, 788, 379 | | | 2, 788, 379 |
| Mississippi | 1, 132, 762 | | 1, 224 | 1, 133, 986 |
| Missouri | 1, 359, 822 | | 12, 938 | 1, 372, 760 |
| Montana | 16, 635, 456 | | 85 | 16, 635, 541 |
| Nebraska | 245, 409 | 94, 307 | | 339, 716 |
| Nevada | 5, 058, 027 | | 1 | 5, 058, 028 |
| New Hampshire | 677, 660 | | | 677, 660 |
| New Mexico | 8, 565, 190 | 133, 183 | 299, 389 | 8, 997, 762 |
| New York | | | 13, 747 | 13, 747 |
| North Carolina | 1, 124, 125 | | 27 | 1, 124, 152 |
| North Dakota | 520 | 1, 104, 330 | | 1, 104, 850 |
| Ohio | 107, 769 | | 138 | 107, 907 |
| Oklahoma | 221, 653 | 46, 211 | | 267, 864 |
| Oregon | 14, 833, 008 | 105, 925 | 525, 585 | 15, 464, 518 |
| Pennsylvania | 471, 077 | | | 471, 077 |
| South Carolina | 587, 260 | | | 587, 260 |
| South Dakota | 1, 120, 813 | 864, 984 | 18, 200 | 2, 003, 997 |
| Tennessee | 594, 770 | | 1, 212 | 595, 982 |
| Texas | 657, 997 | 115, 243 | 2, 025 | 775, 265 |
| Utah | 7, 857, 673 | | 55, 630 | 7, 913, 303 |
| Vermont | 231, 901 | | | 231, 901 |
| Virginia | 1, 447, 249 | | 2, 683 | 1, 449, 932 |
| Washington | 9, 688, 591 | | | 9, 688, 591 |
| West Virginia | 903, 985 | | | 903, 985 |
| Wisconsin | 1, 467, 515 | | 1, 307 | 1, 468, 822 |
| Wyoming | 8, 570, 747 | 573, 331 | | 9, 144, 078 |
| Puerto Rico | 33, 037 | | 27 | 33, 064 |
| Total | 181, 292, 852 | 3, 818, 862 | 1, 048, 597 | 186, 160, 311 |

TABLE 2.—*Area of commercial timberland and volume of timber in the National Forests, January 1, 1962*

| State | Unreserved commercial forest land | Timber volume | | | Sawtimber volume | |
|---|---|---|---|---|---|---|
| | | Sawtimber | Other products [1] | Total | Measured by local scale | Converted to International ¼-inch rule |
| | *Thousand acres* | *Million cubic feet* | *Million cubic feet* | *Million cubic feet* | *Million board feet* | *Million board feet* |
| Alabama | 618 | 354 | 133 | 487 | 1, 538 | 1, 778 |
| Alaska | 5, 320 | 29, 176 | 3, 198 | 32, 374 | 157, 617 | 171, 803 |
| Arizona | 2, 311 | 2, 691 | 609 | 3, 300 | 15, 068 | 17, 328 |
| Arkansas | 2, 331 | 1, 031 | 465 | 1, 496 | 4, 538 | 5, 245 |
| California | 8, 253 | 27, 053 | 1, 338 | 28, 391 | 151, 165 | 160, 235 |
| Colorado | 8, 375 | 9, 654 | 4, 427 | 14, 081 | 35, 796 | 42, 597 |
| Florida | 1, 030 | 151 | 331 | 482 | 665 | 769 |
| Georgia | 741 | 533 | 204 | 737 | 2, 293 | 2, 650 |
| Idaho | 10, 320 | 15, 925 | 3, 946 | 19, 871 | 71, 737 | 84, 650 |
| Illinois | 188 | 46 | 70 | 116 | 319 | 367 |
| Indiana | 112 | 26 | 34 | 60 | 162 | 186 |
| Kentucky | 438 | 239 | 222 | 461 | 1, 273 | 1, 273 |
| Louisiana | 558 | 345 | 122 | 467 | 1, 542 | 1, 782 |
| Maine | 42 | 13 | 43 | 56 | 65 | 65 |
| Michigan | 2, 415 | 347 | 780 | 1, 127 | 2, 168 | 2, 493 |
| Minnesota | 2, 154 | 361 | 935 | 1, 296 | 2, 257 | 2, 596 |
| Mississippi | 1, 107 | 757 | 241 | 998 | 3, 392 | 3, 920 |
| Missouri | 1, 312 | 208 | 401 | 609 | 1, 299 | 1, 494 |
| Montana | 10, 720 | 11, 113 | 7, 992 | 19, 105 | 52, 809 | 61, 787 |
| Nebraska | 44 | 9 | 30 | 39 | 24 | 29 |
| Nevada | 70 | 153 | 33 | 186 | 797 | 917 |
| New Hampshire | 490 | 154 | 690 | 844 | 749 | 749 |
| New Mexico | 2, 912 | 1, 704 | 702 | 2, 406 | 9, 542 | 10, 973 |
| North Carolina | 964 | 528 | 171 | 699 | 2, 279 | 2, 634 |
| Ohio | 88 | 23 | 32 | 55 | 144 | 166 |
| Oklahoma | 204 | 60 | 29 | 89 | 287 | 332 |
| Oregon | 12, 644 | 53, 369 | 7, 899 | 61, 268 | 261, 536 | 323, 520 |
| Pennsylvania | 451 | 242 | 346 | 588 | 1, 056 | 1, 056 |
| South Carolina | 543 | 387 | 99 | 486 | 1, 700 | 1, 965 |
| South Dakota | 979 | 997 | 163 | 1, 160 | 2, 742 | 3, 263 |
| Tennessee | 570 | 303 | 158 | 461 | 1, 321 | 1, 965 |
| Texas | 610 | 598 | 177 | 775 | 2, 720 | 3, 144 |
| Utah | 2, 683 | 2, 168 | 1, 859 | 4, 027 | 10, 898 | 12, 533 |
| Vermont | 223 | 170 | 180 | 350 | 945 | 945 |
| Virginia | 6, 115 | 449 | 625 | 1, 074 | 2, 142 | 2, 142 |
| Washington | 6, 048 | 27, 673 | 1, 508 | 29, 181 | 138, 494 | 171, 317 |
| West Virginia | 818 | 369 | 383 | 752 | 1, 602 | 1, 602 |
| Wisconsin | 1, 366 | 168 | 525 | 693 | 1, 049 | 1, 206 |
| Wyoming | 3, 747 | 4, 297 | 2, 531 | 6, 828 | 18, 928 | 22, 146 |
| Total | 94, 914 | 193, 844 | 43, 631 | 237, 475 | [2] | 1, 125, 622 |

[1] Includes material mainly of less than saw-log size.
[2] Because of variations between local log-scaling rules and their application, these volumes are not addable.

TABLE 3.—*Volume and value of timber cut from National Forests, and area planted and seeded to trees, fiscal year 1961*

| State and Commonwealth | Timber cut | | Area planted and seeded to trees | |
|---|---|---|---|---|
| | Volume | Value | Fiscal year 1961 | Total through June 30, 1961 |
| | *Thousand board feet* | *Dollars* | *Acres* | *Acres* |
| Alabama | 49, 736 | 1, 203, 215 | 3, 790 | 56, 289 |
| Alaska | 354, 156 | 916, 682 | 2, 539 | 4, 258 |
| Arizona | 190, 277 | 1, 524, 814 | 133 | 3, 291 |
| Arkansas | 154, 197 | 4, 311, 317 | 5, 294 | 31, 584 |
| California | 1, 348, 574 | 14, 070, 014 | 16, 682 | 113, 309 |
| Colorado | 130, 562 | 840, 904 | 1, 872 | 73, 606 |
| Florida | 64, 367 | 1, 080, 450 | 4, 323 | 49, 844 |
| Georgia | 58, 242 | 1, 395, 810 | 3, 990 | 30, 229 |
| Idaho | 652, 612 | 5, 633, 567 | 5, 667 | 121, 761 |
| Illinois | 3, 326 | 45, 357 | 290 | 44, 484 |
| Indiana | 2, 510 | 39, 375 | 1, 178 | 22, 789 |
| Iowa | | | | 60 |
| Kentucky | 23, 404 | 351, 408 | 351 | 1, 734 |
| Louisiana | 78, 478 | 1, 705, 968 | 7, 758 | 132, 855 |
| Maine | 1, 967 | 23, 533 | 10 | 77 |
| Michigan | 149, 525 | 1, 009, 364 | 9, 579 | 582, 972 |
| Minnesota | 124, 939 | 813, 777 | 4, 850 | 160, 335 |
| Mississippi | 137, 672 | 3, 026, 219 | 9, 490 | 177, 818 |
| Missouri | 19, 338 | 223, 426 | 1, 859 | 77, 756 |
| Montana | 482, 393 | 3, 182, 309 | 3, 241 | 55, 273 |
| Nebraska | 5 | 140 | 150 | 30, 215 |
| Nevada | 210 | 1, 877 | 41 | 472 |
| New Hampshire | 13, 529 | 227, 192 | | 1, 170 |
| New Mexico | 71, 298 | 497, 039 | 44 | 3, 300 |
| New York | 141 | 379 | | |
| North Carolina | 44, 912 | 757, 944 | 2, 417 | 21, 878 |
| North Dakota | 95 | 957 | | |
| Ohio | 3, 951 | 42, 187 | 1, 179 | 18, 097 |
| Oklahoma | 11, 056 | 220, 792 | 410 | 606 |
| Oregon | 2, 408, 905 | 52, 676, 640 | 49, 016 | 257, 355 |
| Pennsylvania | 22, 768 | 570, 826 | 260 | 18, 901 |
| Puerto Rico | 38 | 912 | | |
| South Carolina | 87, 700 | 2, 557, 216 | 753 | 21, 167 |
| South Dakota | 38, 214 | 314, 587 | 1, 352 | 39, 335 |
| Tennessee | 28, 393 | 461, 686 | 851 | 8, 180 |
| Texas | 101, 769 | 2, 442, 100 | 971 | 53, 119 |
| Utah | 55, 663 | 309, 663 | 60 | 4, 229 |
| Vermont | 7, 243 | 208, 753 | 11 | 1, 430 |
| Virginia | 36, 071 | 272, 491 | 459 | 5, 599 |
| Washington | 1, 235, 506 | 20, 053, 084 | 19, 528 | 201, 671 |
| West Virginia | 27, 485 | 444, 682 | 261 | 16, 761 |
| Wisconsin | 65, 235 | 427, 550 | 2, 029 | 231, 778 |
| Wyoming | 94, 227 | 565, 578 | 376 | 8, 413 |
| Total or average | 8, 380, 689 | 124, 451, 784 | 163, 064 | 2, 684, 000 |

TABLE 4.—*Number of livestock permitted to graze on the National Forests, National Grasslands, and land utilization projects, calendar year 1961*

NATIONAL FORESTS

| State | Cattle, horses, and swine | | Sheep and goats | |
|---|---|---|---|---|
| | Paid permits | Livestock permitted to graze | Paid permits | Livestock permitted to graze |
| | *Number* | *Number* | *Number* | *Number* |
| Alabama | 50 | 608 | 0 | 0 |
| Alaska | 2 | 49 | 1 | 10 |
| Arizona | 902 | 145, 161 | 19 | 66, 933 |
| Arkansas | 115 | 1, 870 | 0 | 0 |
| California | 1, 136 | 102, 515 | 59 | 89, 444 |
| Colorado | 1, 633 | 146, 166 | 407 | 506, 176 |
| Florida | 31 | 1, 385 | 0 | 0 |
| Georgia | 69 | 918 | 0 | 0 |
| Idaho | 1, 755 | 114, 986 | 341 | 540, 987 |
| Illinois | 5 | 67 | 0 | 0 |
| Indiana | 2 | 10 | 0 | 0 |
| Iowa | 6 | 133 | 0 | 0 |
| Louisiana | 65 | 1, 441 | 0 | 0 |
| Michigan | 31 | 492 | 0 | 0 |
| Minnesota | 14 | 162 | 1 | 18 |
| Mississippi | 70 | 1, 194 | 0 | 0 |
| Missouri | 176 | 2, 422 | 1 | 2 |
| Montana | 1, 736 | 117, 219 | 105 | 166, 108 |
| Nebraska | 117 | 13, 965 | 0 | 0 |
| Nevada | 251 | 55, 084 | 39 | 114, 700 |
| New Mexico | 1, 691 | 83, 738 | 101 | 57, 187 |
| North Carolina | 8 | 90 | 0 | 0 |
| Ohio | 8 | 15 | 0 | 0 |
| Oklahoma | 13 | 385 | 0 | 0 |
| Oregon | 859 | 79, 461 | 93 | 116, 428 |
| South Carolina | 35 | 354 | 0 | 0 |
| South Dakota | 516 | 20, 416 | 16 | 8, 384 |
| Tennessee | 9 | 186 | 0 | 0 |
| Texas | 92 | 1, 395 | 0 | 0 |
| Utah | 2, 357 | 100, 211 | 574 | 416, 288 |
| Vermont | 6 | 50 | 0 | 0 |
| Virginia | 5 | 137 | 1 | 40 |
| Washington | 430 | 26, 225 | 19 | 20, 795 |
| West Virginia | 51 | 584 | 18 | 391 |
| Wisconsin | 9 | 140 | 0 | 0 |
| Wyoming | 1, 011 | 113, 939 | 180 | 333, 955 |
| Total | 15, 266 | 1, 133, 173 | 1, 975 | 2, 437, 846 |

NATIONAL GRASSLANDS

| | | | | |
|---|---|---|---|---|
| Colorado | 343 | 20, 166 | 0 | 0 |
| Idaho | 72 | 2, 976 | 0 | 0 |
| Kansas | 122 | 3, 345 | 0 | 0 |
| Nebraska | 44 | 2, 432 | 5 | 2, 755 |
| New Mexico | 90 | 4, 207 | 0 | 0 |
| North Dakota | 669 | 50, 313 | 10 | 1, 554 |
| Oklahoma | 138 | 3, 101 | 0 | 0 |
| Oregon | 54 | 2, 330 | 4 | 5, 690 |
| South Dakota | 511 | 44, 839 | 27 | 11, 410 |
| Texas | 166 | 5, 162 | 0 | 0 |
| Wyoming | 181 | 14, 017 | 69 | 23, 312 |
| Total | 2, 390 | 152, 888 | 115 | 44, 721 |

LAND UTILIZATION PROJECTS

| | | | | |
|---|---|---|---|---|
| California | 19 | 668 | 0 | 0 |
| Colorado | 9 | 102 | 0 | 0 |
| Iowa | 1 | 41 | 0 | 52 |
| Missouri | 49 | 1, 058 | 0 | 0 |
| New Mexico | 89 | 2, 592 | 16 | 8, 471 |
| New York | 135 | 2, 009 | 2 | 169 |
| South Dakota | 7 | 512 | 0 | 0 |
| Texas | 1 | 50 | 0 | 0 |
| Wisconsin | 1 | 20 | 0 | 0 |
| Total | 311 | 7, 052 | 18 | 8, 692 |

TABLE 5.—*Estimated legal harvest of big-game animals [1] on National Forests and National Grasslands, fiscal year 1961*

| State | Deer | Elk | Bear | Bighorn | Total big game [2] |
|---|---|---|---|---|---|
| | *Number* | *Number* | *Number* | *Number* | *Number* |
| Alabama | 920 | | | | 920 |
| Alaska | 13, 000 | 130 | 780 | 15 | 15, 000 |
| Arizona | 26, 000 | 490 | 140 | | 29, 000 |
| Arkansas | 2, 300 | | | | 2, 300 |
| California | 42, 000 | | 870 | | 43, 000 |
| Colorado | 59, 000 | 11, 000 | 560 | 60 | 71, 000 |
| Florida | 1, 600 | | 20 | | 1, 600 |
| Georgia | 1, 500 | | 5 | | 1, 500 |
| Idaho | 39, 000 | 12, 000 | 1, 800 | 80 | 54, 000 |
| Illinois | 990 | | | | 990 |
| Indiana | 180 | | | | 180 |
| Kentucky | 390 | | | | 390 |
| Louisiana | 1, 200 | | | | 1, 200 |
| Maine | 100 | | 8 | | 100 |
| Michigan | 18, 000 | | 500 | | 19, 000 |
| Minnesota | 14, 000 | | 330 | | 14, 000 |
| Mississippi | 2, 000 | | | | 2, 000 |
| Missouri | 4, 700 | | | | 4, 700 |
| Montana | 51, 000 | 8, 800 | 1, 200 | 120 | 63, 000 |
| Nebraska | 550 | | | | 770 |
| Nevada | 13, 000 | | | | 13, 000 |
| New Hampshire | 500 | | 50 | | 550 |
| New Mexico | 32, 000 | 670 | 190 | 10 | 33, 000 |
| North Carolina | 2, 600 | | 130 | | 2, 900 |
| North Dakota | 8, 500 | | | | 10, 000 |
| Ohio | 160 | | | | 160 |
| Oklahoma | 40 | | | | 40 |
| Oregon | 73, 000 | 7, 400 | 980 | | 81, 000 |
| Pennsylvania | 5, 200 | | 60 | | 5, 300 |
| South Carolina | 280 | | | | 280 |
| South Dakota | 11, 000 | | | | 12, 000 |
| Tennessee | 700 | | 25 | | 860 |
| Texas | 400 | | | | 400 |
| Utah | 96, 000 | 1, 200 | 60 | | 97, 000 |
| Vermont | 460 | | 60 | | 520 |
| Virginia | 17, 000 | 3 | 220 | | 17, 000 |
| Washington | 19, 000 | 4, 200 | 1, 400 | | 25, 000 |
| West Virginia | 4, 100 | | 65 | | 4, 200 |
| Wisconsin | 8, 400 | | 200 | | 8, 600 |
| Wyoming | 31, 000 | 9, 000 | 310 | 80 | 45, 000 |

[1] Figures rounded in posting and totals.
[2] Also includes antelope, moose, mountain goat, peccary, and wild boar.

TABLE 6.—*Construction, reconstruction, and maintenance of National Forest (forest development) roads, bridges, and trails, fiscal year 1961*

| State and Commonwealth | Roads | | Bridges: construction, reconstruction, and replacement | Trails | | Total obligations from all funds [1] |
|---|---|---|---|---|---|---|
| | Construction and reconstruction | Existing | | Construction and reconstruction | Existing | |
| | *Miles* | *Miles* | *Number* | *Miles* | *Miles* | *Dollars* |
| Alabama | 0. 1 | 1, 488. 9 | 2 | | | 239, 649 |
| Alaska | 3. 1 | 249. 1 | 2 | 3. 0 | 513. 9 | 1, 018, 256 |
| Arizona | 19. 2 | 9, 848. 0 | 3 | 2. 0 | 3, 619. 9 | 1, 176, 797 |
| Arkansas | 11. 6 | 4, 420. 6 | | | | 496, 624 |
| California | 65. 2 | 29, 192. 1 | 28 | 20. 5 | 15, 330. 8 | 7, 341, 013 |
| Colorado | 64. 9 | 14, 574. 3 | 34 | | 9, 298. 1 | 1, 987, 983 |
| Florida | 6. 4 | 1, 460. 7 | 2 | | | 299, 404 |
| Georgia | 2. 7 | 2, 647. 7 | | | 182. 6 | 261, 904 |
| Idaho | 96. 5 | 15, 883. 7 | 41 | 63. 9 | 20, 693. 7 | 4, 136, 283 |
| Illinois | | 841. 4 | 1 | | | 69, 737 |
| Indiana | 0. 2 | 299. 7 | | | | 11, 877 |
| Iowa | | | | | | |
| Kentucky | 7. 2 | 1, 268. 7 | 1 | | 13. 5 | 211, 733 |
| Louisiana | 1. 9 | 1, 410. 0 | 14 | | | 223, 755 |
| Maine | 0. 5 | 51. 3 | | | 85. 4 | 19, 017 |
| Michigan | 24. 4 | 4, 813. 2 | 2 | | | 516, 915 |
| Minnesota | 37. 4 | 2, 501. 9 | 6 | | 472. 6 | 1, 237, 740 |
| Mississippi | 5. 5 | 2, 536. 9 | | | | 280, 174 |
| Missouri | 5. 7 | 2, 485. 9 | | | | 211, 095 |
| Montana | 70. 4 | 11, 586. 0 | 37 | 35. 1 | 15, 796. 8 | 3, 916, 440 |
| Nebraska | 3. 0 | 285. 2 | | 0. 5 | 0. 5 | 14, 995 |
| Nevada | 1. 8 | 2, 826. 8 | 2 | 4. 5 | 1, 671. 6 | 405, 621 |
| New Hampshire | 3. 9 | 234. 4 | | | 996. 2 | 291, 814 |
| New Mexico | 34. 1 | 6, 742. 1 | 13 | | 3, 681. 6 | 915, 764 |
| North Carolina | 0. 7 | 2, 769. 0 | 1 | | 1, 207. 6 | 313, 897 |
| North Dakota | | 0. 3 | | | | |
| Ohio | 0. 9 | 271. 0 | | | | 11, 248 |
| Oklahoma | 1. 5 | 516. 7 | | | | 37, 871 |
| Oregon | 52. 8 | 22, 289. 6 | 51 | 45. 0 | 9, 886. 9 | 8, 713, 108 |
| Pennsylvania | 9. 0 | 619. 0 | 1 | | 166. 6 | 207, 911 |
| South Carolina | 9. 2 | 1, 720. 6 | | | | 204, 079 |
| South Dakota | 18. 8 | 3, 764. 6 | 13 | | 10. 3 | 241, 232 |
| Tennessee | 4. 7 | 1, 100. 7 | | | 500. 8 | 267, 160 |
| Texas | 2. 8 | 1, 632. 2 | | | | 208, 673 |
| Utah | 33. 5 | 5, 694. 6 | 5 | 15. 5 | 6, 288. 3 | 1, 187, 935 |
| Vermont | 3. 5 | 258. 6 | 3 | | 185. 0 | 144, 959 |
| Virginia | 11. 4 | 1, 615. 8 | 1 | | 862. 0 | 394, 145 |
| Washington | 30. 4 | 8, 747. 5 | 33 | 20. 9 | 8, 850. 8 | 5, 163, 269 |
| West Virginia | 4. 0 | 1, 372. 3 | 3 | | 754. 9 | 254, 573 |
| Wisconsin | 8. 6 | 2, 233. 4 | 8 | | | 397, 788 |
| Wyoming | 36. 2 | 6, 929. 4 | 6 | 19. 4 | 5, 477. 8 | 1, 207, 320 |
| District of Columbia [2] | | | | | | 737, 864 |
| Puerto Rico | 0. 1 | 28. 6 | | | 29. 3 | 34, 530 |
| Total | 693. 8 | 179, 212. 5 | 313 | 230. 3 | 106, 577. 5 | 45, 012, 152 |

[1] Total obligations are for construction, reconstruction, and maintenance.
[2] Administrative expenses.

TABLE 7.—*Use of recreation resources on the National Forests, calendar year 1961*

| State and Commonwealth | Number of visits to— | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Campgrounds | Picnic areas | Winter sports areas | Organization camps | Hotels or resorts | Recreation residences | Wilderness areas | Other forest areas | Total |
| Alabama | 6, 800 | 109, 600 | 0 | 1, 500 | 0 | 0 | 0 | 107, 000 | 224, 900 |
| Alaska | 73, 100 | 122, 800 | 25, 200 | 1, 700 | 82, 900 | 17, 900 | 0 | 711, 900 | 1, 035, 500 |
| Arizona | 711, 300 | 1, 792, 400 | 54, 500 | 45, 200 | 263, 500 | 69, 200 | 12, 800 | 2, 239, 800 | 5, 188, 700 |
| Arkansas | 46, 000 | 361, 000 | 0 | 5, 300 | 107, 200 | 10, 000 | 0 | 1, 387, 300 | 1, 916, 800 |
| California | 2, 460, 400 | 1, 568, 800 | 1, 006, 200 | 268, 000 | 1, 472, 600 | 553, 500 | 215, 600 | 7, 904, 700 | 15, 449, 800 |
| Colorado | 1, 517, 000 | 1, 243, 100 | 600, 200 | 15, 300 | 843, 800 | 46, 900 | 28, 700 | 6, 591, 100 | 10, 886, 100 |
| Florida | 84, 000 | 605, 300 | 0 | 11, 200 | 700 | 12, 400 | 0 | 678, 300 | 1, 391, 900 |
| Georgia | 100, 100 | 766, 000 | 0 | 2, 000 | 7, 000 | 2, 200 | 0 | 693, 800 | 1, 571, 100 |
| Idaho | 647, 200 | 529, 500 | 226, 500 | 35, 000 | 129, 200 | 42, 500 | 49, 000 | 1, 991, 000 | 3, 649, 900 |
| Illinois | 800 | 89, 600 | 0 | 300 | 0 | 0 | 0 | 230, 500 | 321, 200 |
| Indiana | 200 | 8, 800 | 0 | 0 | 0 | 0 | 0 | 128, 900 | 137, 900 |
| Kansas | 0 | 4, 000 | 0 | 0 | 0 | 0 | 0 | 2, 000 | 6, 000 |
| Kentucky | 25, 800 | 174, 800 | 0 | 2, 300 | 34, 500 | 1, 200 | 0 | 412, 300 | 650, 900 |
| Louisiana | 600 | 166, 800 | 0 | 15, 000 | 85, 900 | 10, 000 | 0 | 131, 000 | 409, 300 |
| Maine | 1, 200 | 13, 700 | 0 | 200 | 0 | 0 | 0 | 27, 900 | 43, 000 |
| Michigan | 97, 200 | 207, 000 | 142, 300 | 8, 100 | 5, 400 | 9, 100 | 0 | 3, 450, 400 | 3, 919, 500 |
| Minnesota | 176, 700 | 93, 800 | 25, 500 | 5, 700 | 17, 800 | 12, 500 | 216, 500 | 1, 128, 600 | 1, 677, 100 |
| Mississippi | 4, 800 | 150, 500 | 0 | 9, 200 | 12, 000 | 0 | 0 | 448, 300 | 624, 800 |
| Missouri | 14, 500 | 152, 500 | 0 | 700 | 0 | 0 | 0 | 1, 034, 800 | 1, 202, 500 |
| Montana | 407, 700 | 441, 400 | 201, 700 | 18, 200 | 64, 400 | 66, 400 | 28, 100 | 4, 198, 100 | 5, 426, 000 |
| Nebraska | 2, 100 | 14, 400 | 0 | 200 | 0 | 0 | 0 | 140, 000 | 156, 700 |
| Nevada | 123, 800 | 240, 400 | 43, 000 | 13, 700 | 0 | 1, 800 | 400 | 226, 100 | 649, 200 |
| New Hampshire | 81, 400 | 451, 400 | 176, 300 | 6, 700 | 70, 700 | 0 | 4, 600 | 2, 181, 100 | 2, 972, 200 |
| New Mexico | 441, 300 | 1, 222, 400 | 73, 900 | 21, 500 | 2, 100 | 11, 400 | 32, 800 | 1, 594, 700 | 3, 400, 100 |
| North Carolina | 433, 900 | 1, 051, 000 | 0 | 11, 300 | 11, 400 | 3, 300 | 2, 000 | 2, 014, 500 | 3, 527, 400 |
| North Dakota | 600 | 2, 700 | 0 | 0 | 0 | 0 | 0 | 47, 400 | 50, 700 |
| Ohio | 4, 000 | 35, 600 | 0 | 0 | 0 | 0 | 0 | 85, 200 | 124, 800 |
| Oklahoma | 2, 700 | 64, 700 | 0 | 0 | 0 | 0 | 0 | 49, 200 | 116, 600 |
| Oregon | 1, 444, 300 | 1, 182, 600 | 504, 500 | 40, 700 | 1, 359, 400 | 71, 900 | 49, 600 | 2, 815, 700 | 7, 468, 700 |
| Pennsylvania | 35, 300 | 230, 600 | 0 | 16, 500 | 0 | 24, 100 | 0 | 870, 400 | 1, 176, 900 |
| South Carolina | 1, 600 | 242, 800 | 0 | 0 | 0 | 0 | 0 | 373, 600 | 618, 000 |
| South Dakota | 321, 000 | 788, 600 | 3, 200 | 22, 300 | 16, 900 | 16, 000 | 0 | 1, 614, 000 | 2, 782, 000 |
| Tennessee | 101, 600 | 1, 026, 300 | 0 | 8, 800 | 56, 900 | 22, 400 | 0 | 1, 033, 700 | 2, 249, 700 |
| Texas | 24, 000 | 191, 700 | 0 | 600 | 200 | 0 | 0 | 469, 500 | 686, 000 |
| Utah | 839, 800 | 3, 195, 200 | 511, 800 | 68, 400 | 79, 300 | 58, 000 | 45, 100 | 2, 344, 600 | 7, 142, 200 |
| Vermont | 3, 900 | 45, 000 | 277, 200 | 0 | 0 | 0 | 0 | 242, 400 | 568, 500 |
| Virginia | 53, 200 | 337, 700 | 0 | 7, 100 | 0 | 1, 000 | 0 | 2, 628, 200 | 3, 027, 200 |
| Washington | 949, 000 | 610, 600 | 508, 500 | 38, 800 | 300, 000 | 60, 700 | 19, 400 | 1, 529, 400 | 4, 016, 400 |
| West Virginia | 200, 700 | 238, 800 | 0 | 10, 900 | 0 | 0 | 0 | 635, 300 | 1, 085, 700 |
| Wisconsin | 47, 900 | 161, 400 | 11, 800 | 900 | 400 | 2, 400 | 0 | 419, 000 | 643, 800 |
| Wyoming | 347, 600 | 363, 300 | 86, 000 | 28, 400 | 200, 700 | 43, 700 | 52, 100 | 2, 307, 100 | 3, 428, 900 |
| Puerto Rico | 0 | 158, 200 | 0 | 8, 100 | 85, 000 | 5, 100 | 0 | 31, 500 | 287, 900 |
| Total | 11, 835, 100 | 20, 456, 800 | 4, 478, 300 | 749, 800 | 5, 309, 900 | 1, 175, 600 | 756, 700 | 57, 150, 300 | 101, 912, 500 |

TABLE 8.—*Fires controlled by Forest Service fire organizations to protect National Forest lands, and area burned, calendar year 1961*

| State | Fires | | | | | | Area burned | |
|---|---|---|---|---|---|---|---|---|
| | Lightning | Smoking | Recreation | Incendiary | Other | Total | National Forest | Other ownerships |
| | *Number* | *Number* | *Number* | *Number* | *Number* | *Number* | *Acres* | *Acres* |
| Alabama | 4 | 42 | 19 | 35 | 14 | 114 | 348 | 420 |
| Alaska | | 3 | 1 | | 6 | 10 | 10 | |
| Arizona | 1, 839 | 45 | 69 | 3 | 64 | 2, 020 | 17, 760 | 1, 131 |
| Arkansas | 19 | 21 | 30 | 25 | 45 | 140 | 1, 234 | 594 |
| California | 2, 219 | 250 | 133 | 77 | 389 | 3, 068 | 56, 724 | 3, 582 |
| Colorado | 196 | 20 | 46 | | 25 | 287 | 185 | 15 |
| Florida | 64 | 33 | 12 | 16 | 37 | 162 | 1, 502 | 191 |
| Georgia | | 14 | 8 | 11 | 23 | 56 | 69 | 98 |
| Idaho | 1, 369 | 58 | 63 | 5 | 68 | 1, 563 | 57, 464 | 5, 707 |
| Illinois | | 5 | 6 | 11 | 14 | 36 | 146 | 249 |
| Indiana | | 4 | 1 | 5 | 8 | 18 | 26 | 57 |
| Kentucky | | 13 | 3 | 4 | 14 | 34 | 197 | 67 |
| Louisiana | 1 | 9 | 4 | 30 | 15 | 59 | 753 | 188 |
| Maine | | | 1 | | | 1 | | |
| Michigan | 4 | 58 | 31 | 12 | 80 | 185 | 289 | 526 |
| Minnesota | 29 | 43 | 48 | 21 | 66 | 207 | 611 | 1, 382 |
| Mississippi | 5 | 37 | 23 | 87 | 37 | 189 | 833 | 459 |
| Missouri | 5 | 35 | 74 | 88 | 82 | 284 | 685 | 1, 277 |
| Montana | 999 | 67 | 42 | 3 | 102 | 1, 213 | 30, 338 | 4, 556 |
| Nebraska | 7 | | | | | 7 | 334 | |
| Nevada | 49 | 5 | | | 6 | 60 | 1, 698 | 54 |
| New Hampshire | 1 | 1 | 1 | | 3 | 6 | 1 | |
| New Mexico | 1, 018 | 17 | 26 | 2 | 34 | 1, 097 | 2, 011 | 51 |
| North Carolina | 2 | 26 | 22 | 35 | 51 | 136 | 439 | 661 |
| North Dakota | | | | | 2 | 2 | 9 | |
| Ohio | | 6 | 2 | 6 | 23 | 37 | 45 | 100 |
| Oklahoma | | 2 | 4 | 11 | 10 | 27 | 674 | 279 |
| Oregon | 1, 555 | 120 | 234 | 12 | 165 | 2, 086 | 9, 759 | 3, 475 |
| Pennsylvania | 1 | 1 | 1 | | 3 | 6 | 67 | |
| South Carolina | 2 | 28 | 12 | 63 | 53 | 158 | 693 | 544 |
| South Dakota | 168 | 1 | 12 | 3 | 27 | 211 | 33 | 3 |
| Tennessee | 2 | 10 | 20 | 43 | 19 | 94 | 338 | 244 |
| Texas | 1 | 16 | 11 | 9 | 15 | 52 | 159 | 32 |
| Utah | 166 | 19 | 23 | 2 | 30 | 240 | 1, 207 | 1, 530 |
| Vermont | | | | | 1 | 1 | | |
| Virginia | 2 | 11 | 7 | 5 | 37 | 62 | 318 | 214 |
| Washington | 694 | 66 | 112 | | 97 | 969 | 5, 315 | 2, 333 |
| West Virginia | 2 | 5 | 3 | | 1 | 11 | 49 | 2 |
| Wisconsin | 1 | 16 | 6 | 7 | 17 | 47 | 27 | 814 |
| Wyoming | 152 | 6 | 25 | 2 | 19 | 204 | 1, 193 | 16 |
| Total | 10, 576 | 1, 113 | 1, 135 | 633 | 1, 702 | 15, 159 | 193, 543 | 30, 851 |

TABLE 9.—*Forest fires on protected State and private lands, and area burned, calendar year 1961; and expenditures for control, fiscal year 1961*

| State | Area protected | Fires | Area burned | Prevention and suppression expenditures | | | |
|---|---|---|---|---|---|---|---|
| | | | | Federal | State and county | Private [1] | Total |
| | *Thousand acres* | *Number* | *Acres* | *Dollars* | *Dollars* | *Dollars* | *Dollars* |
| Alabama | 19, 900 | 5, 896 | 88, 544 | 327, 300 | 1, 038, 811 | 150, 989 | 1, 517, 100 |
| Alaska | 3, 185 | 25 | 298 | 28, 757 | 28, 758 | | 57, 515 |
| Arkansas | 16, 535 | 2, 343 | 49, 606 | 276, 200 | 799, 344 | 84, 234 | 1, 159, 778 |
| California | 19, 810 | 2, 631 | 212, 641 | 1, 144, 000 | 14, 492, 067 | | 15, 636, 067 |
| Colorado | 7, 407 | 199 | 5, 500 | 32, 900 | 123, 203 | | 156, 103 |
| Connecticut | 1, 989 | 250 | 967 | 42, 600 | 154, 673 | | 197, 273 |
| Delaware | 453 | 29 | 37 | 10, 685 | 11, 158 | | 21, 843 |
| Florida | 17, 231 | 6, 241 | 95, 108 | 544, 100 | 2, 974, 196 | 156, 707 | 3, 675, 003 |
| Georgia | 22, 081 | 8, 862 | 67, 125 | 496, 000 | 2, 611, 594 | 73, 376 | 3, 180, 970 |
| Hawaii | 1, 152 | 35 | 1, 953 | 15, 600 | 20, 699 | | 36, 299 |
| Idaho | 7, 343 | 795 | 8, 405 | 153, 700 | 309, 292 | 104, 092 | 567, 084 |
| Illinois | 3, 170 | 406 | 7, 402 | 50, 400 | 186, 241 | | 236, 641 |
| Indiana | 3, 926 | 180 | 5, 557 | 46, 600 | 70, 135 | | 116, 735 |
| Iowa | 2, 277 | 9 | 22 | 30, 000 | 49, 049 | | 79, 049 |
| Kentucky | 9, 586 | 1, 469 | 27, 643 | 145, 100 | 646, 090 | | 791, 190 |
| Louisiana | 11, 899 | 3, 573 | 47, 486 | 331, 800 | 1, 704, 347 | 19, 164 | 2, 055, 311 |
| Maine | 16, 973 | 402 | 2, 481 | 234, 500 | 1, 141, 736 | | 1, 376, 236 |
| Maryland | 2, 850 | 258 | 547 | 114, 000 | 510, 357 | | 624, 357 |
| Massachusetts | 3, 252 | 4, 001 | 5, 686 | 109, 800 | 407, 914 | | 517, 714 |
| Michigan | 17, 205 | 1, 270 | 8, 833 | 399, 400 | 1, 939, 554 | | 2, 338, 954 |
| Minnesota | 17, 771 | 1, 536 | 71, 540 | 270, 900 | 680, 355 | | 951, 255 |
| Mississippi | 14, 339 | 5, 730 | 65, 728 | 346, 700 | 1, 808, 744 | | 2, 155, 444 |
| Missouri | 9, 882 | 2, 717 | 37, 475 | 207, 700 | 758, 067 | | 965, 767 |
| Montana | 6, 915 | 397 | 10, 976 | 105, 500 | 114, 117 | 426, 319 | 645, 936 |
| Nebraska | 1, 100 | 63 | 856 | 7, 500 | 4, 016 | 4, 271 | 15, 787 |
| Nevada | 2, 216 | 71 | 128 | 33, 300 | 180, 550 | | 213, 850 |
| New Hampshire | 4, 182 | 341 | 798 | 75, 900 | 171, 571 | 6, 662 | 254, 133 |
| New Jersey | 2, 095 | 876 | 4, 835 | 101, 400 | 409, 852 | | 511, 252 |
| New Mexico | 1, 747 | 85 | 646 | 30, 000 | 56, 391 | 25, 985 | 112, 376 |
| New York | 12, 995 | 663 | 4, 440 | 218, 500 | 853, 953 | | 1, 072, 453 |
| North Carolina | 17, 279 | 3, 480 | 59, 221 | 310, 700 | 1, 250, 856 | 30, 437 | 1, 591, 993 |
| North Dakota | 121 | 9 | 778 | 5, 664 | 5, 665 | 500 | 11, 829 |
| Ohio | 3, 923 | 657 | 1, 872 | 87, 300 | 316, 456 | | 403, 756 |
| Oklahoma | 4, 488 | 435 | 39, 541 | 130, 700 | 241, 263 | 19, 112 | 391, 075 |
| Oregon | 12, 141 | 1, 252 | 45, 976 | 522, 700 | 2, 348, 850 | 544, 625 | 3, 416, 175 |
| Pennsylvania | 14, 704 | 534 | 3, 037 | 188, 200 | 757, 330 | | 945, 530 |
| Rhode Island | 434 | 100 | 475 | 35, 800 | 132, 582 | | 168, 382 |
| South Carolina | 11, 175 | 4, 576 | 56, 362 | 297, 200 | 1, 293, 308 | | 1, 590, 508 |
| South Dakota | 2, 827 | 139 | 106 | 31, 000 | 65, 852 | | 96, 852 |
| Tennessee | 11, 367 | 3, 014 | 19, 248 | 267, 200 | 908, 530 | 4, 133 | 1, 179, 863 |
| Texas | 9, 770 | 953 | 10, 197 | 251, 400 | 848, 406 | 112, 347 | 1, 212, 153 |
| Utah | 5, 903 | 221 | 16, 396 | 33, 600 | 53, 438 | | 87, 038 |
| Vermont | 3, 517 | 114 | 248 | 30, 000 | 56, 382 | | 86, 382 |
| Virginia | 14, 033 | 1, 158 | 3, 807 | 269, 000 | 1, 058, 469 | 5, 503 | 1, 332, 972 |
| Washington | 12, 280 | 1, 658 | 12, 245 | 527, 900 | 2, 791, 829 | 150, 000 | 3, 469, 729 |
| West Virginia | 9, 007 | 591 | 8, 975 | 126, 599 | 324, 561 | | 451, 160 |
| Wisconsin | 15, 297 | 1, 906 | 13, 317 | 319, 800 | 1, 777, 686 | | 2, 097, 486 |
| Wyoming | 2, 186 | 97 | 194 | 18, 000 | 22, 618 | | 40, 618 |
| Total | 411, 918 | 72, 247 | 1, 125, 258 | 9, 383, 605 | 48, 510, 915 | 1, 918, 456 | 59, 812, 976 |

[1] Private expenditures, spent under direct supervision of State Foresters, as part of the Clarke-McNary program.

TABLE 10.—*Distribution of forest and windbarrier planting stock by cooperating States, fiscal year 1961 (under Clarke-McNary program)*

| State and Commonwealth | Expenditures derived from— | | | | Trees distributed (F.Y. 1961) |
|---|---|---|---|---|---|
| | Federal allotment | State appropriation | Receipts | All sources | |
| | *Dollars* | *Dollars* | *Dollars* | *Dollars* | *Thousands* |
| Alabama | 4, 200 | 69, 498 | 180, 413 | 254, 111 | 64, 447 |
| Alaska | 0 | 0 | 0 | 0 | 0 |
| Arizona | 0 | 0 | 0 | 0 | 0 |
| Arkansas | 4, 200 | 44, 714 | 71, 591 | 120, 505 | 17, 641 |
| California | 4, 200 | 46, 046 | 21, 006 | 71, 252 | 2, 191 |
| Colorado | 7, 300 | 10, 291 | 26, 564 | 44, 155 | 493 |
| Connecticut | 4, 200 | 9, 669 | 30, 181 | 44, 050 | 1, 563 |
| Delaware | 4, 200 | 11, 511 | 0 | 15, 711 | 880 |
| Florida | 4, 400 | 128, 286 | 246, 540 | 379, 226 | 59, 794 |
| Georgia | 4, 200 | 70, 434 | 297, 761 | 372, 395 | 71, 069 |
| Hawaii | 4, 200 | 166, 881 | 0 | 171, 081 | 1, 159 |
| Idaho | 4, 200 | 5, 089 | 17, 909 | 27, 198 | 487 |
| Illinois | 4, 200 | 37, 748 | 75, 970 | 117, 918 | 5, 137 |
| Indiana | 4, 200 | 110, 995 | 93, 527 | 208, 722 | 6, 139 |
| Iowa | 0 | 0 | 27, 000 | 27, 000 | 1, 256 |
| Kansas | 5, 221 | 19, 011 | 42, 931 | 67, 163 | 957 |
| Kentucky | 4, 200 | 165, 664 | 115, 304 | 285, 168 | 15, 452 |
| Louisiana | 4, 200 | 103, 846 | 269, 851 | 377, 897 | 73, 901 |
| Maine | 4, 200 | 23, 687 | 14, 677 | 42, 564 | 1, 033 |
| Maryland | 4, 200 | 45, 216 | 743 | 50, 159 | 4, 859 |
| Massachusetts | 4, 200 | 35, 896 | 14, 860 | 54, 956 | 695 |
| Michigan | 4, 200 | 177, 965 | 112, 924 | 295, 089 | 23, 429 |
| Minnesota | 4, 200 | 12, 901 | 270, 944 | 288, 045 | 18, 995 |
| Mississippi | 4, 200 | 119, 685 | 244, 502 | 368, 387 | 83, 004 |
| Missouri | 4, 200 | 64, 871 | 26, 093 | 95, 164 | 4, 133 |
| Montana | 4, 200 | 21, 161 | 37, 628 | 62, 989 | 1, 059 |
| Nebraska | 0 | 0 | 84, 400 | 84, 400 | 1, 922 |
| Nevada | 5, 700 | 5, 954 | 3, 628 | 15, 282 | 45 |
| New Hampshire | 4, 200 | 23, 661 | 14, 316 | 42, 177 | 1, 538 |
| New Jersey | 4, 200 | 9, 808 | 10, 142 | 24, 150 | 644 |
| New Mexico | 4, 200 | 6, 748 | 4, 235 | 15, 183 | 101 |
| New York | 4, 200 | 228, 702 | 142, 035 | 374, 937 | 27, 723 |
| North Carolina | 4, 200 | 9, 756 | 263, 386 | 277, 342 | 47, 222 |
| North Dakota | 4, 200 | 19, 364 | 35, 785 | 59, 349 | 1, 412 |
| Ohio | 4, 200 | 129, 432 | 120, 044 | 253, 676 | 14, 548 |
| Oklahoma | 4, 200 | 27, 954 | 18, 342 | 50, 496 | 3, 098 |
| Oregon | 4, 200 | 91, 513 | 72, 618 | 168, 331 | 10, 543 |
| Pennsylvania | 4, 200 | 183, 195 | 77, 793 | 265, 188 | 12, 953 |
| Puerto Rico | 4, 700 | 56, 599 | 0 | 61, 299 | 1, 321 |
| Rhode Island | 4, 200 | 10, 540 | 3, 265 | 18, 005 | 399 |
| South Carolina | 0 | 55, 377 | 179, 986 | 235, 363 | 53, 243 |
| South Dakota | 7, 600 | 22, 055 | 139, 332 | 168, 987 | 1, 730 |
| Tennessee | 4, 200 | 12, 142 | 121, 314 | 137, 656 | 30, 966 |
| Texas | 2, 396 | 2, 396 | 116, 471 | 121, 263 | 21, 086 |
| Utah | 3, 931 | 3, 931 | 6, 840 | 14, 702 | 115 |
| Vermont | 4, 200 | 46, 322 | 21, 299 | 71, 821 | 3, 257 |
| Virginia | 4, 200 | 6, 755 | 156, 978 | 167, 933 | 37, 290 |
| Washington | 0 | 10, 273 | 99, 016 | 109, 289 | 9, 465 |
| West Virginia | 4, 200 | 29, 836 | 56, 433 | 90, 469 | 4, 007 |
| Wisconsin | 4, 200 | 200, 480 | 250, 781 | 455, 461 | 29, 577 |
| Wyoming | 2, 040 | 2, 040 | 7, 263 | 11, 343 | 181 |
| Total | 194, 488 | 2, 695, 898 | 4, 244, 621 | 7, 135, 007 | 774, 159 |

TABLE 11.—*Planting stock available for forest and windbarrier planting on State and private lands, area planted or seeded, and plantable area, by State and Commonwealth*

| State and Commonwealth | Planting stock shipped, fiscal year 1961 | | | Area planted or seeded, F.Y. 1961 [2] | Plantable area as of Jan. 1, 1953 [3] |
|---|---|---|---|---|---|
| | State nurseries | Other | Total [1] | | |
| | *Thousands* | *Thousands* | *Thousands* | *Acres* | *Acres* |
| Alabama | 82, 907 | 15, 100 | 98, 007 | 131, 060 | 1, 675, 000 |
| Alaska | 0 | 0 | 0 | 0 | ---------- |
| Arizona | 0 | 0 | 0 | 78 | 18, 000 |
| Arkansas | 21, 482 | 0 | 21, 482 | 21, 998 | 1, 408, 000 |
| California | 3, 176 | 454 | 3, 630 | 6, 661 | 3, 357, 000 |
| Colorado | 269 | 30 | 299 | 1, 388 | 295, 000 |
| Connecticut | 2, 502 | 0 | 2, 502 | 1, 525 | 205, 000 |
| Delaware | 880 | 0 | 880 | 813 | 34, 000 |
| District of Columbia | ---------- | ---------- | ---------- | ---------- | ---------- |
| Florida | 68, 384 | 90, 972 | 159, 356 | 173, 685 | 4, 859, 000 |
| Georgia | 113, 526 | 74, 608 | 188, 134 | 198, 826 | 1, 566, 000 |
| Hawaii | 1, 159 | 0 | 1, 159 | 2, 104 | ---------- |
| Idaho | 607 | 0 | 607 | 846 | 265, 000 |
| Illinois | 7, 303 | 0 | 7, 303 | 5, 189 | 2, 856, 000 |
| Indiana | 5, 593 | 0 | 5, 593 | 5, 509 | 1, 290, 000 |
| Iowa | 1, 330 | 319 | 1, 649 | 1, 866 | 613, 000 |
| Kansas | 0 | 1, 900 | 1, 900 | 1, 836 | 915, 000 |
| Kentucky | 14, 036 | 700 | 14, 736 | 18, 103 | 1, 500, 000 |
| Louisiana | 75, 313 | 11, 829 | 87, 142 | 115, 014 | 1, 139, 000 |
| Maine | 4, 284 | 11 | 4, 295 | 6, 577 | 472, 000 |
| Maryland | 5, 169 | 0 | 5, 169 | 5, 732 | 250, 000 |
| Massachusetts | 779 | 0 | 779 | 785 | 114, 000 |
| Michigan | 14, 004 | 37, 006 | 51, 010 | 34, 544 | 2, 905, 000 |
| Minnesota | 41, 293 | 1, 616 | 42, 909 | 42, 021 | 2, 410, 000 |
| Mississippi | 88, 214 | 4, 846 | 93, 060 | 143, 230 | 4, 187, 000 |
| Missouri | 4, 847 | 10 | 4, 857 | 4, 630 | 1, 267, 000 |
| Montana | 1, 202 | 696 | 1, 898 | 2, 387 | 214, 000 |
| Nebraska | 0 | 4, 194 | 4, 194 | 5, 867 | 968, 000 |
| Nevada | 45 | 0 | 45 | 84 | 28, 000 |
| New Hampshire | 1, 834 | 0 | 1, 834 | 1, 709 | 309, 000 |
| New Jersey | 704 | 113 | 817 | 644 | 93, 000 |
| New Mexico | 0 | 0 | 0 | 509 | 1, 250, 000 |
| New York | 41, 597 | 836 | 42, 433 | 39, 427 | 97, 000 |
| North Carolina | 66, 879 | 16, 614 | 83, 493 | 71, 062 | 898, 000 |
| North Dakota | 1, 985 | 8, 253 | 10, 238 | 11, 564 | 742, 000 |
| Ohio | 15, 621 | 1, 710 | 17, 331 | 16, 388 | 729, 000 |
| Oklahoma | 4, 320 | 0 | 4, 320 | 3, 295 | 876, 000 |
| Oregon | 13, 552 | 317 | 13, 869 | 72, 549 | 969, 000 |
| Pennsylvania | 13, 994 | 39, 072 | 53, 066 | 40, 232 | 1, 080, 000 |
| Puerto Rico | 1, 346 | 0 | 1, 346 | 1, 479 | ---------- |
| Rhode Island | 0 | 0 | 0 | 373 | 39, 000 |
| South Carolina | 138, 609 | 7, 330 | 145, 939 | 157, 654 | 1, 169, 000 |
| South Dakota | 424 | 3, 338 | 3, 462 | 7, 571 | 702, 000 |
| Tennessee | 31, 416 | 33, 543 | 64, 959 | 44, 013 | 1, 465, 000 |
| Texas | 20, 808 | 25, 800 | 46, 608 | 52, 971 | 539, 000 |
| Utah | 110 | 0 | 110 | 256 | 37, 000 |
| Vermont | 5, 663 | 0 | 5, 663 | 6, 113 | 99, 000 |
| Virginia | 35, 168 | 10, 632 | 45, 800 | 39, 472 | 1, 799, 000 |
| Washington | 13, 297 | 10, 435 | 23, 732 | 45, 248 | 751, 000 |
| West Virginia | 4, 357 | 0 | 4, 357 | 4, 829 | 989, 000 |
| Wisconsin | 31, 115 | 4, 067 | 35, 182 | 41, 977 | 2, 685, 000 |
| Wyoming | 0 | 0 | ---------- | 511 | 95, 000 |
| Total | 1, 001, 103 | 406, 351 | 1, 407, 454 | 1, 592, 204 | 52, 222, 000 |

[1] Represents planting stock produced within each State; adjusted for known significant shipments of stock from one State to another.

[2] Includes 131,362 acres of direct seeding primarily in Georgia, Louisiana, Oregon, and Washington. It is estimated that not more than 80 percent of these plantings and seedings are successful.

[3] Figures are those reported in "Timber Resources for America's Future." Alaska, Hawaii, and Puerto Rico were not included in the timber resources study.

TABLE 12.—*Cooperative forest management accomplishments and expenditures, fiscal year 1961*

(U.S. Forest Service and State Foresters cooperating in 483 projects)

| State and Commonwealth | Accomplishments | | | | Expenditures | | |
|---|---|---|---|---|---|---|---|
| | Woodland owners assisted | Woodland involved | Products harvested | Gross sale value | Federal | State | Total |
| | *Number* | *Acres* | *M bd. ft.* | *Dollars* | *Dollars* | *Dollars* | *Dollars* |
| Alabama | 1, 086 | 74, 679 | 11, 934 | 214, 372 | 25, 849 | 25, 849 | 51, 698 |
| Arkansas | 1, 155 | 90, 722 | 2, 308 | 46, 816 | 25, 496 | 42, 764 | 68, 260 |
| California | 1, 832 | 284, 962 | 44, 691 | 1, 066, 683 | 29, 379 | 70, 226 | 99, 605 |
| Colorado | 130 | 22, 814 | 821 | 17, 901 | 11, 000 | 12, 386 | 23, 386 |
| Connecticut | 1, 735 | 21, 426 | 1, 224 | 35, 778 | 18, 740 | 24, 717 | 43, 457 |
| Delaware | 55 | 1, 966 | 695 | 15, 310 | 3, 605 | 3, 653 | 7, 258 |
| Florida | 3, 952 | 1, 180, 352 | 20, 216 | 616, 490 | 53, 312 | 205, 517 | 258, 829 |
| Georgia | 4, 124 | 243, 589 | 13, 658 | 353, 210 | 50, 210 | 146, 643 | 196, 853 |
| Idaho | 268 | 13, 619 | 92 | 3, 677 | 5, 750 | 10, 881 | 16, 631 |
| Illinois | 1, 526 | 35, 557 | 3, 534 | 120, 346 | 39, 229 | 65, 997 | 105, 226 |
| Indiana | 1, 534 | 46, 529 | 4, 612 | 178, 505 | 12, 670 | 47, 322 | 59, 992 |
| Iowa | 1, 245 | 16, 858 | 759 | 53, 772 | 14, 698 | 36, 784 | 51, 482 |
| Kansas | 149 | 3, 278 | 159 | 9, 913 | 6, 000 | 18, 144 | 24, 144 |
| Kentucky | 5, 975 | 68, 077 | 2, 321 | 74, 937 | 45, 431 | 145, 034 | 190, 465 |
| Louisiana | 318 | 41, 802 | 2, 931 | 43, 036 | 26, 204 | 43, 881 | 70, 085 |
| Maine | 1, 270 | 67, 747 | 20, 492 | 292, 575 | 38, 589 | 111, 005 | 149, 594 |
| Maryland | 1, 665 | 22, 620 | 3, 340 | 104, 136 | 33, 780 | 70, 181 | 103, 961 |
| Massachusetts | 1, 863 | 39, 149 | 24, 614 | 453, 318 | 10, 100 | 20, 104 | 30, 204 |
| Michigan | 3, 148 | 84, 998 | 10, 267 | 234, 524 | 51, 749 | 81, 069 | 132, 818 |
| Minnesota | 3, 693 | 32, 616 | 9, 227 | 299, 456 | 25, 194 | 37, 096 | 62, 290 |
| Mississippi | 970 | 98, 413 | 2, 186 | 49, 304 | 26, 845 | 78, 574 | 105, 419 |
| Missouri | 1, 755 | 197, 552 | 8, 988 | 227, 410 | 55, 837 | 85, 564 | 141, 401 |
| Montana | 356 | 51, 455 | 745 | 11, 186 | 15, 122 | 26, 487 | 41, 609 |
| Nebraska | 481 | 3, 391 | 197 | 24, 281 | 7, 000 | 9, 095 | 16, 095 |
| Nevada | 40 | 9, 158 | 100 | 1, 712 | 4, 230 | 6, 569 | 10, 799 |
| New Hampshire | 2, 744 | 103, 584 | 7, 989 | 195, 945 | 27, 336 | 37, 905 | 65, 241 |
| New Jersey | 879 | 40, 619 | 3, 041 | 67, 897 | 22, 693 | 46, 605 | 69, 298 |
| New Mexico | 81 | 92, 147 | 30, 826 | 263, 561 | 20, 000 | 22, 402 | 42, 402 |
| New York | 5, 455 | 194, 078 | 28, 718 | 875, 012 | 94, 366 | 118, 974 | 213, 340 |
| North Carolina | 4, 658 | 116, 387 | 11, 990 | 297, 296 | 51, 528 | 112, 073 | 163, 601 |
| North Dakota | 161 | 12, 339 | 307 | 11, 879 | 7, 547 | 19, 286 | 26, 833 |
| Ohio | 2, 423 | 67, 168 | 5, 149 | 153, 330 | 50, 754 | 102, 152 | 152, 906 |
| Oklahoma | 562 | 40, 043 | 150 | 300 | 9, 243 | 9, 243 | 18, 486 |
| Oregon | 1, 841 | 63, 976 | 6, 077 | 232, 945 | 17, 162 | 44, 367 | 61, 529 |
| Pennsylvania | 2, 485 | 36, 968 | 5, 441 | 159, 101 | 41, 104 | 111, 162 | 152, 266 |
| Rhode Island | 318 | 8, 932 | 525 | 6, 796 | 4, 660 | 8, 863 | 13, 523 |
| South Carolina | 3, 803 | 292, 237 | 21, 883 | 643, 751 | 37, 442 | 97, 227 | 134, 669 |
| South Dakota | 332 | 3, 688 | 2, 595 | 11, 745 | 13, 000 | 20, 192 | 33, 192 |
| Tennessee | 949 | 112, 715 | 5, 908 | 166, 101 | 30, 146 | 41, 048 | 71, 194 |
| Texas | 674 | 109, 540 | 1, 730 | 35, 309 | 23, 962 | 45, 190 | 69, 152 |
| Utah | 78 | 22, 108 | 434 | 4, 354 | 6, 603 | 6, 603 | 13, 206 |
| Vermont | 3, 365 | 60, 060 | 12, 198 | 441, 970 | 48, 918 | 70, 931 | 119, 849 |
| Virginia | 4, 665 | 204, 525 | 130, 388 | 2, 747, 844 | 82, 476 | 202, 044 | 284, 520 |
| Washington | 2, 682 | 97, 108 | 5, 593 | 126, 429 | 20, 765 | 49, 762 | 70, 527 |
| West Virginia | 2, 350 | 41, 876 | 4, 151 | 124, 944 | 31, 977 | 56, 091 | 88, 068 |
| Wisconsin | 7, 343 | 137, 995 | 20, 121 | 659, 099 | 76, 736 | 293, 381 | 370, 117 |
| Total, U.S. | 88, 173 | 4, 611, 422 | 495, 325 | 11, 774, 256 | 1, 354, 437 | 2, 941, 043 | 4, 295, 480 |
| Puerto Rico | 1, 081 | 1, 535 | 0 | 1, 692 | 8, 500 | 12, 937 | 21, 437 |
| Grand total | 89, 254 | 4, 612, 957 | 495, 325 | 11, 775, 948 | 1, 362, 937 | 2, 953, 980 | 4, 316, 917 |

TABLE 13.—*Pest control accomplishments and costs, calendar year 1961*

WHITE PINE BLISTER RUST

| Ownership or management | Control by ribes eradication | | | | | | Control with antibiotics | | |
|---|---|---|---|---|---|---|---|---|---|
| | Areas of pre-maintenance work | | Areas of maintenance work | | Ribes eradicated | Areas where control was established | Area surveyed [2] | Area treated | Trees treated |
| | Surveyed [1] | Treated | Surveyed [1] | Treated | | | | | |
| | *Acres* | *Acres* | *Acres* | *Acres* | *Number* | *Acres* | *Acres* | *Acres* | *Number* |
| USDA, Forest Service | 117, 933 | 25, 374 | 79, 023 | 5, 881 | 1, 975, 000 | 16, 811 | 232, 810 | 52, 193 | 10, 573, 083 |
| Department of the Interior: | | | | | | | | | |
| National Parks | 49, 415 | 10, 584 | 9, 437 | 7, 579 | 325, 000 | 6, 582 | ---- | 2, 140 | 251, 000 |
| Bureau of Land Management | 21, 392 | 1, 400 | 1, 393 | 100 | 184, 000 | 3, 609 | ---- | 181 | 6, 875 |
| Indian Reservations | 648 | 648 | 8, 660 | 3, 326 | 99, 000 | ---- | ---- | ---- | ---- |
| Subtotal, USDI | 71, 455 | 12, 632 | 19, 490 | 11, 005 | 608, 000 | 10, 191 | ---- | 2, 321 | 257, 875 |
| Total Federal | 189, 388 | 38, 006 | 98, 513 | 16, 886 | 2, 583, 000 | 27, 002 | 232, 810 | 54, 514 | 10, 830, 958 |
| Non-Federal | 589, 934 | 101, 415 | 1, 563, 005 | 42, 885 | 3, 940, 000 | 82, 995 | 186, 600 | 12, 945 | 1, 724, 000 |
| Grand total | 779, 322 | 139, 421 | 1, 661, 518 | 59, 771 | 6, 523, 000 | 109, 997 | 419, 410 | 67, 459 | 12, 554, 958 |

OAK WILT

| Ownership or management | Area surveyed | Trees treated | Funds expended | | |
|---|---|---|---|---|---|
| | | | Federal | State | Total |
| | *Thousand acres* | *Number* | *Dollars* | *Dollars* | *Dollars* |
| National Forest: | | | | | |
| Cumberland | 457 | 13 | 2, 338 | ---- | 2, 338 |
| Monongahela | 450 | 40 | 1, 235 | ---- | 1, 235 |
| Jefferson | 543 | ---- | 899 | ---- | 899 |
| George Washington | 896 | 55 | 1, 820 | ---- | 1, 820 |
| Ozark | 1, 300 | ---- | 2, 527 | ---- | 2, 527 |
| Subtotal | 3, 646 | 108 | 8, 819 | ---- | 8, 819 |
| State and private: | | | | | |
| Arkansas | 3, 500 | 208 | 3, 514 | 7, 028 | 10, 542 |
| Kentucky | 5, 412 | 540 | 11, 461 | 50, 987 | 62, 448 |
| North Carolina | 1, 320 | 63 | 2, 445 | 4, 890 | 7, 335 |
| Pennsylvania | 13, 500 | 852 | 11, 166 | 34, 303 | 45, 469 |
| Virginia | 4, 000 | 99 | 1, 641 | 6, 233 | 7, 874 |
| West Virginia | 15, 000 | 2, 294 | 28, 407 | 95, 515 | 123, 922 |
| Subtotal | 42, 732 | 4, 056 | 58, 634 | 198, 956 | 257, 590 |
| Grand total | 46, 378 | 4, 164 | 67, 453 | 198, 956 | 266, 409 |

INSECTS

| Ownership or management | Bark beetles | | Defoliators | | Other insects | | Total costs |
|---|---|---|---|---|---|---|---|
| | Trees treated [3] | Control costs | Area treated | Control costs | Area treated | Control costs | |
| | *Number* | *Dollars* | *Acres* | *Dollars* | *Acres* | *Dollars* | *Dollars* |
| National Forests | 1, 106, 558 | 2, 185, 778 | 11, 166 | 66, 774 | 5, 848 | [4] 132, 175 | [4] 2, 384, 727 |
| State and private | 113, 005 | 208, 216 | 70, 000 | 73, 378 | 629 | 39, 234 | 320, 828 |
| Total | 1, 219, 563 | 2, 393, 994 | 81, 166 | 140, 152 | 6, 477 | 171, 409 | 2, 705, 555 |

[1] Systematically inspected to locate area in need of treatment and to determine effectiveness of control.
[2] Inspected to determine where antibiotic treatment is feasible and justified from the cost-benefit standpoint.
[3] Includes infested trees, stumps, and cull material.
[4] Includes Federal expenditure of Forest Pest Control Act funds on cooperative projects on non-Federal land.

TABLE 14.—*Statement of Forest Service receipts and expenditures, all programs and sources, fiscal year 1961*

| Item | Receipts | Expenditures |
|---|---|---|
| National Forest programs: | | |
| Cash receipts and appropriation expenditures | $129, 621, 785 | $266, 617, 249 |
| Noncash income and expense (roads built by timber purchasers) | 44, 239, 096 | 44, 239, 096 |
| Total | 173, 860, 881 | 310, 856, 345 |
| Forest research programs: | | |
| Forest research appropriations | | 18, 666, 691 |
| Cooperative research work | 855, 191 | 953, 922 |
| Total | 855, 191 | 19, 620, 613 |
| State and private forestry programs: | | |
| Fire protection, tree distribution, and forest management cooperation | | 12, 383, 654 |
| Soil bank program | | 232, 820 |
| Great Plains Conservation Program | | 16, 177 |
| Insect and disease control | | 1, 546, 329 |
| Flood prevention and watershed protection | | 1, 432, 699 |
| Forest fire prevention "Smokey Bear" | 22, 303 | 19, 723 |
| Cooperator funds | 1, 957, 405 | 2, 016, 536 |
| Total | 1, 979, 708 | 17, 647, 938 |
| Work for other government agencies and nongovernment persons and firms: | | |
| Insect and disease control (Interior Department lands) | | 65, 807 |
| Miscellaneous work for other government agencies | 2, 807, 952 | 3, 103, 941 |
| Work performed for nongovernment persons, firms, etc.—cooperative work | 2, 491, 031 | 2, 498, 209 |
| Reimbursed | 637, 261 | 637, 261 |
| Total | 5, 936, 244 | 6, 305, 218 |
| Total receipts and expenditures | 182, 632, 024 | 354, 430, 114 |
| Cash receipts distributed to States, counties, and Puerto Rico as directed by Congress (receipts of fiscal year 1960 except as indicated) | | |
| Payments to States and Puerto Rico (Act 5/23/08) National Forest fund | | [1] 35, 408, 615 |
| Payments to School Funds, Arizona and New Mexico (Act 6/20/10) National Forest fund | | 139, 726 |
| Payment to Minnesota (Cook, Lake, and St. Louis Counties) (Superior National Forest) (Act 6/22/48) National Forest fund | | 123, 275 |
| Payment to counties—National Grasslands and land utilization areas (Act 7/22/37) (receipts of calendar year 1960) | | 391, 987 |
| Total | | 36, 063, 603 |
| Internal equipment and supply services (Working Capital Fund): Financed primarily by charges included above to Forest Service programs | 22, 332, 381 | 22, 646, 087 |

[1] Does not include approximately $3,408,422 due counties from fiscal year 1960 receipts on National Forest O&C lands. This amount was included in total receipts of $4,544,589 transferred to Interior for distribution under Act of Aug. 28, 1937 (50 Stat. 874), as amended.

NOTE: Expenditures are on an obligation basis except Working Capital Fund, which is on accrual basis.



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